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ABSTRACT

This report describes the United States oats industry from producers to consumers and provides a single source of economic and statistical information on oats. Background information on oats is provided first. The report then examines the basic factors of supply, demand, and price to determine what caused the decline in the importance of oats and how smoothly it was made. Other sections highlight the marketing system (assembly, storage, handling, grading and inspection, transportation, processing, and exporting), costs, government policy and programs, and world trade for oats (production, consumption, stocks, and trade). The report includes 51 tables within the text and 13 appendix tables. A listing of references is also appended. (YLB)

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Number 573

The U.S. Oats Industry

Linwood A. Hoffman
Janet Livezey

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ABSTRACT

U.S. farmers produced about 16 percent of the total world oats production during 1980-85, down from more than 29 percent during 1960-64 when the United States was the largest producer. During that same time, world oats production dropped from about 49.5 million metric tons to about 45.3 million metric tons. The United States, Soviet Union, and Canada produced more than 58 percent of total world oats production during 1980-85. U.S. oats production is now second to that of the Soviet Union. The value of U.S. oats grain production dropped from 3d among all grains in 1950 to 16th in 1985. The yield per acre has tended to increase by 0.7 bushel per year, but the number of acres harvested for grain has trended downward by 955,000 acres per year. This report describes the U.S. oats industry from producers to consumers and provides a single source of economic and statistical information on oats.

Keywords: Oats, oats industry, production, demand and pricing, marketing, cost of production, Government programs, and world production and trade.

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SUMMARY

U.S. farmers produced about 16 percent of the total world oats production during 1980-85, down from more than 29 percent during 1960-64 when the United States was the largest producer. During that same time, annual world oats production dropped from about 49.5 million metric tons to about 45.3 million metric tons. The United States, Soviet Union, and Canada produced more than 58 percent of total world oats production during 1980-85. U.S. oats grain production is now second to that of the Soviet Union. The value of U.S. oats grain production dropped from 3d among all grains in 1950 to 16th in 1985. The yield per acre has tended to increase by 0.7 bushel per year, but the acres harvested for grain has dropped 955,000 acres per year.

Oats were traditionally a major U.S. crop from colonial days until the middle of the 20th century. Acreage and total production began to decline during the fifties as other cash crops such as soybeans, corn, and wheat became more profitable, as oats' use as a livestock feed ingredient decreased, as oats' use as a rotation crop declined, and as farms became increasingly specialized.

Most oats consumption has traditionally been as livestock feed on the farms where the oats were produced. Decreased numbers of dairy cattle and livestock for drayage and increased competition from other grains and oilseeds for livestock feed have significantly reduced the demand for oats for use as a feed grain. Total use of oats should begin to stabilize as the racehorse and pleasure-horse industries increase their use of oats coupled with increased human consumption.

Government program costs for oats have been minimal compared with other commodities receiving Government support. Producer participation in Government programs has been relative low, partly because most oats are consumed on the farm where grown, oats prices are directly related to corn prices, and supply and demand were relatively balanced within the oats sector during 1950-85. Oat producers receive income and price support in the form of a two-tiered system of target prices and loan rates, acreage controls, and the farmer-owned grain reserve.

Although world oats production has tended to decline since 1960, some countries have increased their production considerably. The Soviet Union increased both its production and its share of total world production from about 15 percent during 1960-64 to almost 36 percent during 1980-85. Its production rose from 7.2 million metric tons to 16.1 million, surpassing the United States as the world leader during 1970-74.

Because oats are mostly consumed as animal feed on or near the farm where produced, world trade has been minimal. During 1960-85, world oats trade was only 1-2 million metric tons annually. In recent years, the United States has become a net importer of oats after many years of being a net exporter.

The U.S. Oats Industry

Linwood A. Hoffman
Janet Livezey*

INTRODUCTION

Oats have been a major U.S. crop since colonial times when acreage planted to this crop was exceeded by only corn and wheat. Oats became well established on the Atlantic seaboard especially in the North and moved west with the frontier settlers. Oats were popular on pioneer farms because the crop provided feed and bedding for horses and other livestock. Oats have historically been a multipurpose crop planted for numerous reasons other than as a cash grain crop. Nongrain uses include straw, pasture, forage, conservation, or as a companion crop with the establishment of a legume crop, such as alfalfa.

However, the significance of oats has fallen markedly since the midfifties when it ranked fourth among the acres planted to principal crops, about 12 percent of the total (69).1/ Oats acreage was exceeded by corn, wheat, and all other hay. By 1985, oats acreage dropped to seventh, 4 percent of the total.

The quantity of U.S. oats consumed has steadily declined since the midfifties. Most of the reduction has been in onfarm feeding, while the off-farm component declined less severely. Nevertheless, over half of the oats grain fed are still consumed on the farm where oats are produced. About 85 percent of total oats disappearance now goes to feed use. Food and seed use claim the remaining 15 percent about equally. Exports, although highly variable, claim less than 1 percent of disappearance. Since 1982, the United States has become a net importer of oats.

This report examines the basic factors of supply, demand, and price to determine what caused the decline in the importance of oats and how smoothly it was made. Costs of production, Government policy and programs, the marketing system, and world trade for oats are also examined.

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* The authors are agricultural economists in the Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture.

1/ Underscored numbers in parentheses identify literature cited in the References at the end of this report.

BACKGROUND

Oats, a member of the grass family, are believed to be native to Western Asia and Eastern Europe. The center of U.S. oats production moved from the eastern seaboard to the upper Mississippi Valley by 1869.

Biological Identification

Oats belong to the genus *Avena* (monocotyledons) of the grass family Gramineae (*13*, p. 20). Other members of this botanical family are corn, barley, sorghum, wheat, rye, rice, and various millets. All of these grains are known as cereal crops because they are grown for their edible starchy seeds. The grass family also includes most native and cultivated pasture and hay crops, excluding legumes which are dicotyledons.

Cultivated oats are derived chiefly from two species, the common wild oat (*Avena fatua*) and the wild red oat (*Avena sterilis*) (*13*, p. 27). White-kerneled oats (*Avena sativa*) are the most popular species grown today and are believed to have developed from the common wild oat with some inheritance from the wild red oat and the cultivated red oat. Red oats (*Avena byzantina*) are derived directly from the wild red oat.

The oat plant is an annual grass with fibrous roots, hollow stems, and flat leaves. Its height ranges from 3-5 feet. A single seed usually produces 3-7 stems. The leaves range from 6-12 inches in length and from 0.5-1.5 inches in width. The flowers (which give rise to the oat grain) are located at the upper end of the stems, are self-pollinated, and open for only a few hours after fertilization. Most domestic varieties of oats are planted in the spring and reach maturity 90-120 days after germination, although in the South some oats are planted in the fall.

Origin and History

The origin of cultivated oats is not clearly known, but available information indicates that the oat plant is a native of central or western Asia and eastern Europe (*13*, p. 32). For centuries, oats were considered a weed in barley and wheat fields. As cultivation of barley and wheat spread to the damper climate of northwest Europe, oats were cultivated in their own right. White oats were grown in northern Europe and were used to make oatmeal, bread, and beer. Red oats were grown in the Mediterranean region and were predominantly used as forage for livestock.

According to records of the earliest settlements, oats were first planted in the United States on Cuttyhunk, an island off the Massachusetts coast, along with other small grains in 1602 (*13*, p. 37). However, none of the small grains were widely grown because they could not rival corn in cheapness or adaptability to pioneer conditions. Unsuitable varieties and a lack of information on how to grow these crops in a new environment contributed to their slow adoption.

Oats eventually became well established on the Atlantic seaboard, but were grown more in the North than in the South. The acreage of oats increased as new land was opened for cultivation in the 17th and 18th centuries, principally in eastern Pennsylvania, northern New Jersey, and southern New York. Pennsylvania Dutch farmers found oats useful as a livestock feed, fitting well into their general farming operation. Southern farmers, however, concentrated most of their resources on growing tobacco.

The location of oats production has shifted considerably throughout U.S. history (table 1). Prior to 1850, oats production was almost exclusively found east of the Mississippi River. As pioneer settlers moved westward, oats production expanded into these areas as well.

By 1869, the center of production had moved to the upper Mississippi Valley. Illinois became the leading State followed by Pennsylvania, New York, Ohio, Indiana, and Wisconsin in descending order. Immigrant farmers from northern Europe were familiar with growing oats and found them to be a dependable crop in the North Central States.

Oats remained a major crop in the United States until about the midfifties when acreage and production began to decline. Replacement of horses by tractors, trucks, and cars greatly reduced the population of a major consumer of oats.

Herbicides and pesticides have made oats less valuable as a rotation crop. Oats had been used in crop rotations to break up the cycles of soil-borne insects and diseases. More important, other crops, such as soybeans or corn, proved more profitable and soon replaced oats as a major crop.

Value of Production

In the midfifties, oats harvested for grain ranked fourth among principle crops grown in the United States, following corn, wheat, and all other hay (51). By 1985, oats had fallen to 16th in terms of grain value, down from 3d in 1950 (70). Soybeans, tobacco, sorghum, and rice are some of the crops which have surpassed oats in value.

Oats have historically been a multipurpose crop planted for numerous reasons other than as a cash crop. Industry sources estimate that oats harvested as grain account for only about 60 percent of total crop value (45, 47). Straw, pasture, and forage are a significant 40 percent of total crop value. In some regions of the country, oats are planted principally as a pasture or a forage crop.

SUPPLY

The United States produces about 16 percent of world oats grain production, down from about 35 percent in the early fifties. Production of oats for grain is concentrated in the North Central States. Annual U.S. supply is composed mostly of production and beginning stocks (table 2). Oats imports are generally insignificant except for a 5-percent contribution to total supply in 1953 and 1984.

Carryover Stocks

Carryover stocks of oats, while generally small in relation to production, are an important supply variable because of their shortrun effects on price. These stocks are in addition to the supply available from current production

Table 1--Acreage harvested and production of U.S. oats for grain by region

Region	Acreage harvested in--				
	1870	1900	1930	1960	1985
	1,000 acres				
North Atlantic 1/	2,672	2,902	2,063	1,339	581
East North Central 2/	3,510	10,825	11,851	6,620	1,750
West North Central 3/	1,793	12,540	20,630	14,777	4,805
South Atlantic 4/	1,392	1,275	1,151	808	186
South Central 5/	873	2,466	2,819	1,939	426
West 6/	108	1,041	1,333	1,105	401
United States	10,348	31,049	39,847	26,588	8,149

Region	Grain production in--				
	1870	1900	1930	1960	1985
	1,000 bushels				
North Atlantic 1/	71,733	83,564	74,581	62,710	42,383
East North Central 2/	104,907	400,851	409,789	347,508	124,030
West North Central 3/	51,856	345,815	663,309	613,453	298,575
South Atlantic 4/	20,811	18,954	23,407	28,632	8,271
South Central 5/	15,306	67,288	63,168	60,837	20,740
West 6/	3,334	29,011	40,338	40,192	24,127
United States	267,947	945,483	1,274,592	1,153,332	518,626

1/ Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania.

2/ Ohio, Indiana, Illinois, Michigan, Wisconsin.

3/ Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas.

4/ Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida.

5/ Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas.

6/ Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California.

Source: (19, 69).

for use during the marketing year that begins June 1.

Most of the stocks are stored on the farm where the oats are grown. The remaining stocks are held by elevators, processors, or feed manufacturers

Table 2--Supply of U.S. oats by major category

Crop year 1/	Beginning stocks			Imports	Production	Total supply
	On farm	Off farm	Total			
	Million bushels					
1950	249.9	30.2	280.1	28.2	1,369.2	1,677.5
1951	323.3	37.9	361.2	55.7	1,277.6	1,694.5
1952	301.1	39.8	340.9	74.6	1,217.4	1,632.8
1953	268.2	39.5	307.7	79.4	1,153.2	1,540.3
1954	250.7	34.1	284.8	24.2	1,409.6	1,718.6
1955	306.1	68.2	374.3	3.7	1,496.0	1,874.0
1956	341.5	79.0	420.5	14.6	1,151.4	1,586.5
1957	240.8	51.3	292.1	24.7	1,289.9	1,606.7
1958	338.1	53.1	391.2	5.4	1,401.4	1,798.0
1959	371.8	73.9	445.7	2.0	1,050.1	1,497.8
1960	275.7	46.0	321.7	1.4	1,153.3	1,476.4
1961	323.8	62.2	386.0	1.2	1,010.3	1,397.5
1962	280.8	52.7	333.5	4.0	1,012.2	1,349.7
1963	277.7	47.5	325.2	4.1	965.5	1,294.8
1964	297.1	66.1	363.2	3.2	852.3	1,218.7
1965	258.8	65.8	324.6	4.1	929.6	1,258.3
1966	297.3	80.5	377.9	3.8	803.3	1,185.0
1967	240.6	76.8	317.4	3.3	793.8	1,114.5
1968	245.2	70.8	316.0	2.1	950.7	1,268.8
1969	322.0	102.4	424.4	2.0	965.9	1,392.3
1970	402.4	145.3	547.7	1.5	915.2	1,464.4
1971	369.2	201.2	570.4	3.1	878.1	1,451.6
1972	384.2	212.3	596.5	3.3	690.6	1,290.4
1973	272.3	191.1	463.4	.2	659.1	1,122.7
1974	189.5	118.0	307.5	.3	600.7	908.5
1975	143.4	80.6	224.0	.7	639.0	863.7
1976	158.5	46.3	204.8	1.4	540.0	746.6
1977	128.7	35.6	164.3	2.2	752.8	919.3
1978	259.5	53.6	313.1	.7	581.7	895.5
1979	229.3	50.7	280.0	.9	526.7	807.6
1980	198.3	38.1	236.4	1.3	458.8	696.5
1981	148.9	28.1	177.0	1.6	509.5	688.1
1982	127.1	24.8	151.9	3.9	592.6	748.4
1983	181.2	38.6	219.8	30.1	477.0	726.9
1984	151.3	29.8	181.1	34.0	473.7	688.8
1985	146.5	33.4	179.9	27.5	520.8	728.2

1/ Reflects June through May crop year.
Source: (60).

(table 2). Farmers and feed manufacturers require carryover stocks to provide a ready supply until the next harvest season. These stocks consist of working inventories and excess supplies. In recent years, working inventory requirements have been estimated to total about 130-200 million bushels, approximately 3-5 months of use. Thus, excess supplies of oats have not appeared too large in the 1980's, except for 1980 and 1983.

Imports

Imported oats have been a relatively small percentage of total supply over the past 36 years. During 1950-85, this percentage ranged from less than 1 percent to 5 percent. In 1954, imports peaked at 80 million bushels, 5 percent of total supply. Most of these imports were from Canada. Between 1957 and 1983, imports have been small, but in 1983 they edged upward because of competitive prices stimulated, in part, by the strengthening U.S. dollar in relation to other currencies. Most of the 1983 imports originated in Canada, and northern Europe (notably Sweden and Finland) provided most of the shipments in 1984. This shift was caused by both a drop in quality of the Canadian crop and competitive prices from northern Europe.

Production

Between 1950 and 1985, production of oats for grain declined from a high of 1.5 billion bushels in 1955 to 0.5 billion bushels in 1980. Although yield has been trending upward by 0.7 bushel per year, the number of acres harvested for grain has been trending downward by about 955,000 acres per year.

Location of Production

Oats are grown throughout the United States (fig. 1). White oats are usually grown in northern regions of the world because they thrive in a cool, moist climate. Although popular as a livestock feed, white oats are also preferred by the oat milling industry for processing into food products.

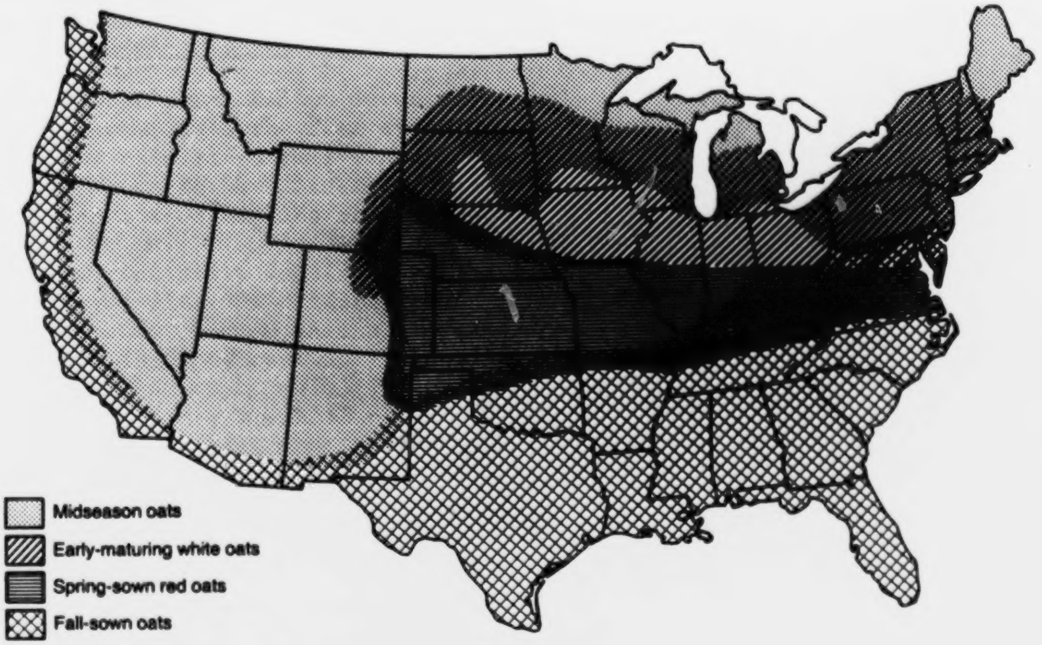
Red oats are grown in areas too warm for satisfactory growth of white oats, such as the South or west coast. Often this type of oats is used for winter pasture of livestock and later harvested for grain. In recent years, genetic crosses between the two types of oats have made some red oats more like the popular white oats.

Because oats are a relatively lightweight and low-value commodity, they tend to be consumed near the point of production. Oats are used mostly as a feed for dairy cattle and horses. Oats grown in the North Central Region are mostly harvested for grain (fig. 2). For example, during 1980-85, South Dakota, Minnesota, Iowa, Wisconsin, and North Dakota (in descending order of importance) have accounted for an average of 63 percent of all oats harvested for grain (table 3).

Oats are also used as a pasture, forage, nurse, or cover crop, thus explaining their widespread use throughout the United States. Pasture and forage use is concentrated in the South. Texas ranked fourth in total acreage planted to oats (10 percent of total) during 1980-84 but produced only 4 percent of the oats grown for grain. Oats are valuable as a winter pasture because they produce an excellent, succulent forage at a time when other high-protein feeds are scarce. Oats have complemented the expansion of the cattle industry in

Figure 1

Oat types grown in the United States



Source: (14).

this region. California produces more small grain hay than any other State, mostly from oats or wild oats. In the Northeast and North Central States, oats may be cut for silage, especially when following heavily fertilized corn. On the Coastal Plain and gulf coast, winter oats have been commonly used for 50 years for both grazing and grain.

Because oats may be used in a variety of ways, States which lead in grain production do not necessarily lead in acres planted. During 1980-84, an average of 14.7 million acres were planted, for example. Six States accounted for an average of 65 percent of these acres: South Dakota, 14 percent; Iowa, 13 percent; Minnesota, 13 percent; Texas, 10 percent; and North Dakota, 8 percent. Acreage used for pasture, forage, conservation, or as a companion crop accounts for most of the difference in acres planted and harvested.

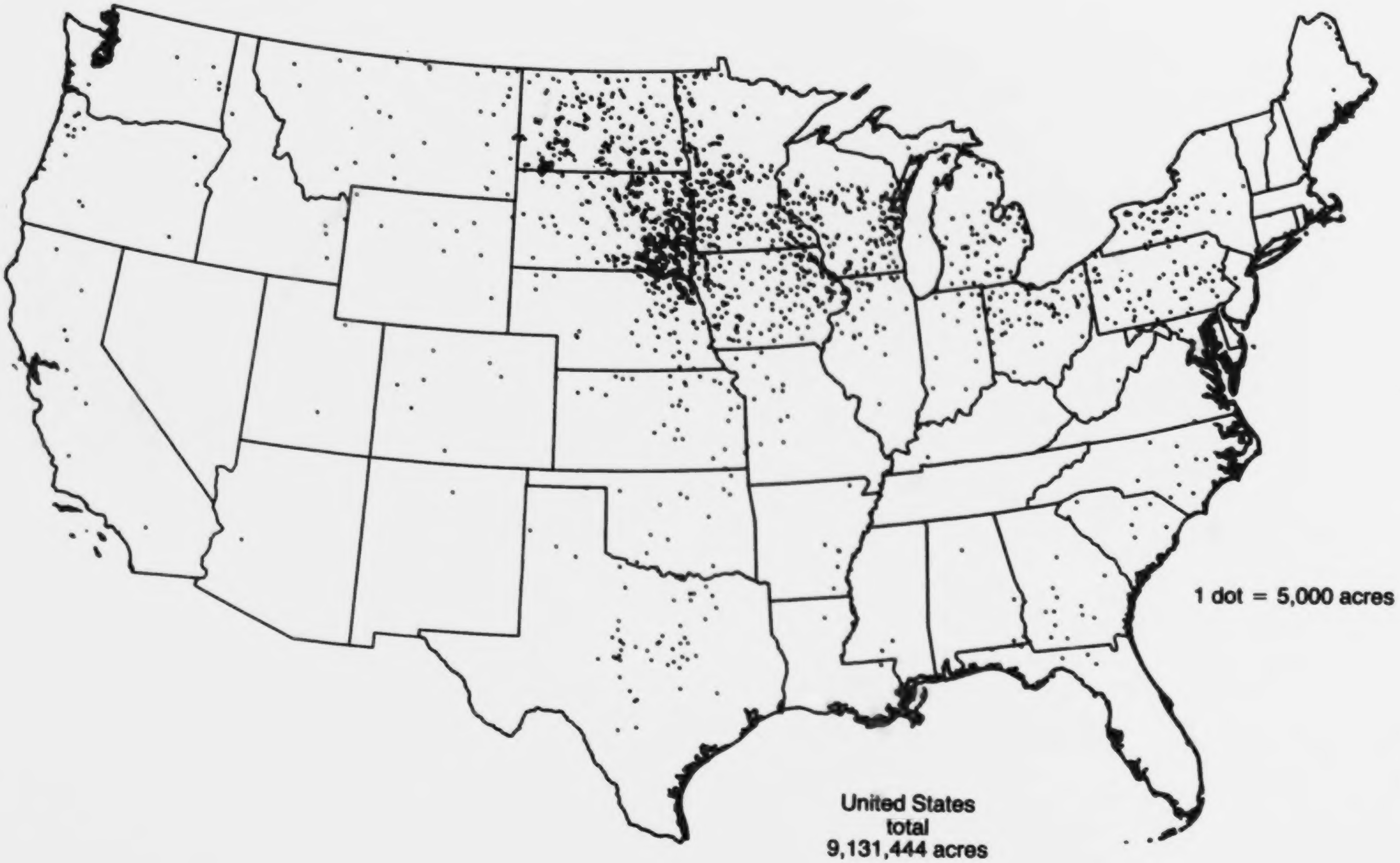
Production Practices

Oats may be grown under several different cropping patterns. They may be planted as a companion crop for grass or legume seedings, planted as a cover crop to prevent wind and water erosion, or planted for pasture, grain, or straw or for all three.

Spring or northern white oats are the most common species grown in the United States. Other species are red oats (grown in the South) and grey oats (grown in the Northwest). Spring oats are usually planted in April and May (table 4 and fig. 3). Seed beds can be prepared with a disc, moldboard, or chisel plow, and the soil should be well drained. Seeding rates vary depending upon

Figure 2

Location of oats harvested for grain in the United States, 1982


1 dot = 5,000 acres
United States
total
9,131,444 acres

Source: (70).

Table 3--U.S. oats production by selected States and years

State	1930-39 average	1940-49 average	1950-59 average	1960-69 average	1970-79 average	1980-85 average
			1,000 bushels			
Maine	4,320	3,281	3,251	1,952	1,766	2,673
New York	23,817	23,711	30,436	26,408	18,437	15,598
Pennsylvania	26,405	25,331	28,936	24,400	19,228	18,663
Ohio	42,814	43,748	48,201	41,070	26,683	19,135
Indiana	41,123	48,158	47,509	24,532	11,031	5,868
Illinois	115,090	143,533	130,616	64,491	23,900	12,528
Michigan	39,026	52,531	46,365	32,460	19,883	22,160
Wisconsin	75,456	113,497	135,184	112,015	74,119	51,822
Minnesota	133,528	174,751	185,321	164,491	126,228	83,768
Iowa	185,271	198,417	208,403	119,346	76,651	53,175
Missouri	36,989	44,949	33,040	10,900	5,203	3,290
North Dakota	28,342	64,394	53,580	86,709	71,777	45,240
South Dakota	37,372	86,060	91,766	97,881	98,280	84,263
Nebraska	42,750	58,716	46,702	25,359	25,466	18,250
Kansas	32,525	34,735	22,448	8,888	6,052	7,374
Oklahoma	26,083	25,284	12,777	7,589	5,264	3,583
Texas	34,980	30,912	26,202	19,147	16,799	14,987
Montana	5,907	12,486	8,905	8,796	9,429	5,872
Total 18 States	931,798	1,184,494	1,159,642	876,434	601,388	468,247
All other States	75,343	127,157	122,139	67,250	76,823	36,347
United States	1,007,141	1,311,651	1,281,781	943,684	678,211	504,594

Source: (19, 69).

location and purpose of the crop. State agronomy guides are a good source of specific information on these rates. Oats can be produced with only minimal amounts of fertilizer, but respond well to a prudent fertilization program.

Harvest of spring white oats generally begins 3 months after planting (table 4 and fig. 3). The moisture content of oats during harvest should be 14 percent or less. Methods of harvest are direct combining or windrowing followed several days later by combining from the windrow (49). In many dairy areas, oats are harvested as green chop or silage, also called "oatlage."

Red or winter oats are generally grown between latitudes 20° to 40° north. Winter oats cultivation is similar to spring oats, but planting is in the early fall. Before winter arrives, plant growth is adequate to provide pasture for livestock. In the spring, livestock are removed to allow the

Table 4--Oats: Usual planting and harvesting dates, by State

State	Sowing season	1984 harvested acreage	Usual planting dates	Usual harvesting dates		
				Begin	Most active	End
		1,000 acres				
Maine	Spring	40	May 10-June 10	Aug. 20	Sept. 5-Oct. 1	Oct. 15
New York	Spring	180	Apr. 20-May 30	Aug. 1	Aug. 10-Aug. 25	Sept. 10
New Jersey	Fall	6	Sept. 20-Oct. 20	July 15	July 20-Aug. 10	Aug. 20
	Spring		Mar. 15-Apr. 25	July 15	July 20-Aug. 10	Aug. 20
Pennsylvania	Fall	280	Sept. 1-Sept.20	July 15	July 20-Aug. 1	Aug. 20
	Spring		Apr. 10-May 25	July 20	Aug. 1-Aug. 10	Sept. 1
Ohio	Spring	220	Apr. 1-May 10	July 15	July 20-Aug. 5	Aug. 15
Indiana	Spring	80	Apr. 1-Apr. 30	July 5	July 10-July 30	Aug. 5
Illinois	Spring	165	Mar. 25-May 1	July 10	July 15-Aug. 1	Aug. 15
Michigan	Spring	350	Apr. 15-May 30	July 20	July 25-Aug. 20	Aug. 30
Wisconsin	Spring	840	Apr. 14-May 5	July 25	Aug. 5-Aug. 15	Aug. 25
Minnesota	Spring	1,200	Apr. 10-May 25	July 25	Aug. 1-Aug. 20	Sept. 10
Iowa	Spring	740	Apr. 5-May 1	July 15	July 20-Aug. 1	Aug. 15
Missouri	Spring	33	Mar. 1-Apr. 25	June 15	June 25-July 10	July 20
North Dakota	Spring	980	Apr. 15-June 1	Aug. 5	Aug. 15-Sept. 1	Sept. 5
South Dakota	Spring	1,550	Apr. 5-May 15	July 15	July 20-Aug. 10	Aug. 15
Nebraska	Spring	300	Mar. 20-May 1	July 1	July 5-July 15	July 25
Kansas	Spring	120	Feb. 25-May 1	June 25	June 30-July 10	July 20
Maryland	Fall	15	Sept. 15-Nov. 10	June 15	June 25-July 10	July 25
	Spring		Mar. 20-May 1	June 25	July 5-July 25	Aug. 5
Virginia	Fall	12	Sept. 5-Oct. 25	June 1	June 10-July 1	July 10
	Spring		Feb. 1-Apr. 15	June 15	July 5-July 25	Aug. 5
West Virginia	Spring	8	Apr. 10-May 10	July 15	July 15-Aug. 10	Aug. 20
North Carolina	Fall	68	Sept. 15-Nov. 1	May 25	June 10-June 25	July 5
South Carolina	Fall	40	Oct. 1-Dec. 10	May 20	May 20-June 10	June 20
	Spring		Jan. 10-Mar. 1	June 1	June 20-June 20	July 1
Georgia	Fall	60	Sept. 10-Dec. 1	May 20	June 1-June 10	June 25
Kentucky	Fall	6	Aug. 25-Oct. 1	June15	June 20-July 5	July 15
	Spring		Mar. 1-Apr. 15	June25	June 1-July 15	July 25
Tennessee	Fall	5	Sept. 1-Nov. 1	June 1	June 15-July 5	July 10
	Spring 1/		n.a.	n.a.	n.a.	n.a.
Alabama	Fall	30	Sept. 20-Dec. 1	May 15	June 1-June 20	July 1
Arkansas	Fall	28	Sept. 15-Nov. 15	June 1	June 5-June 15	June 25
	Spring		Feb. 20-May 20	June 10	June 15-July 15	July 5
Oklahoma	Fall	80	Sept. 15-Oct. 30	June 1	June 10-June 20	June 30
	Spring		Jan. 30-Mar. 25	June 1	June 20-June 20	June 30
Texas	Fall	250	Sept. 5-Nov. 20	May 15	June 1-June 15	June 20
Montana	Spring	105	Apr. 10-June 5	Aug. 5	Aug. 10-Sept. 1	Sept. 15
Idaho	Spring	44	Mar. 25-May 25	Aug. 1	Aug. 10-Sept. 20	Oct. 10
Wyoming	Spring	70	Apr. 5-May 20	Aug. 5	Aug. 10-Sept. 25	Sept. 1
Colorado	Spring	50	Mar. 20-May 5	July 15	July 25-Aug. 30	Sept. 20
Utah	Spring	13	Mar. 20-May 5	July 15	July 25-Aug. 30	Sept. 20
Washington	Spring	30	Mar. 10-Apr. 10	July 25	Aug. 1-Aug. 25	Sept. 10
Oregon	Fall	75	Oct. 1-Feb. 15	July 10	July 25-Aug. 15	Sept. 1
	Spring		Feb. 15-Apr. 15	Aug. 10	Aug. 20-Sept. 10	Sept. 20
California	Fall	50	Nov. 1-Mar. 1	July 1	July 15-July 30	Aug. 15
	Spring		Mar. 1-May 10	Aug. 25	Sept. 1-Sept. 20	Sept. 30

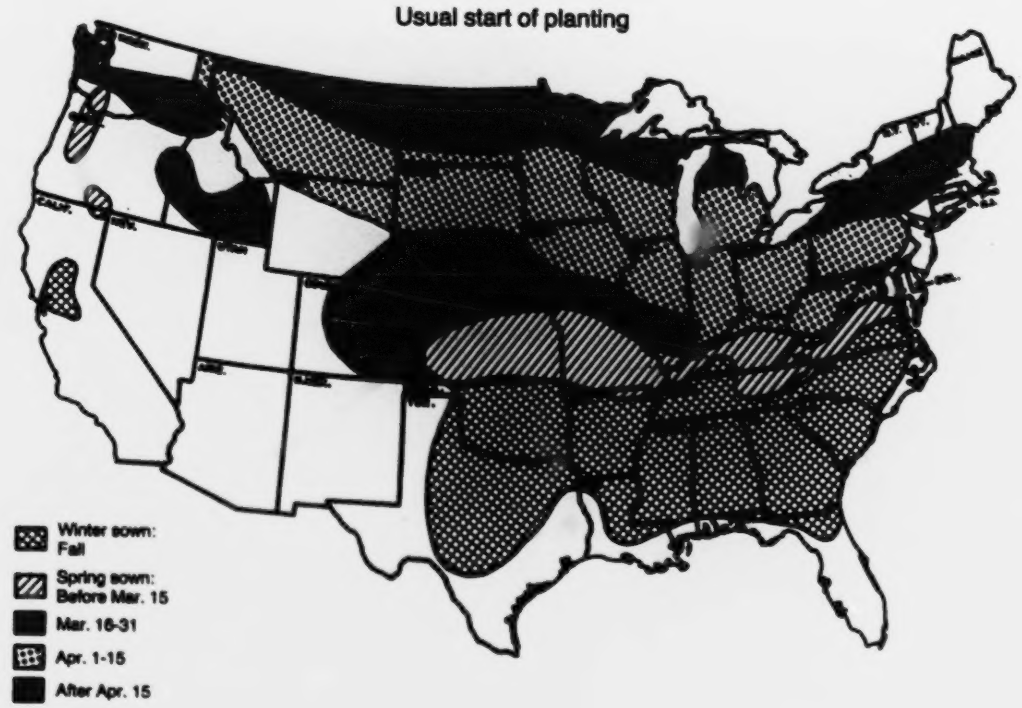
n.a. = Not applicable.

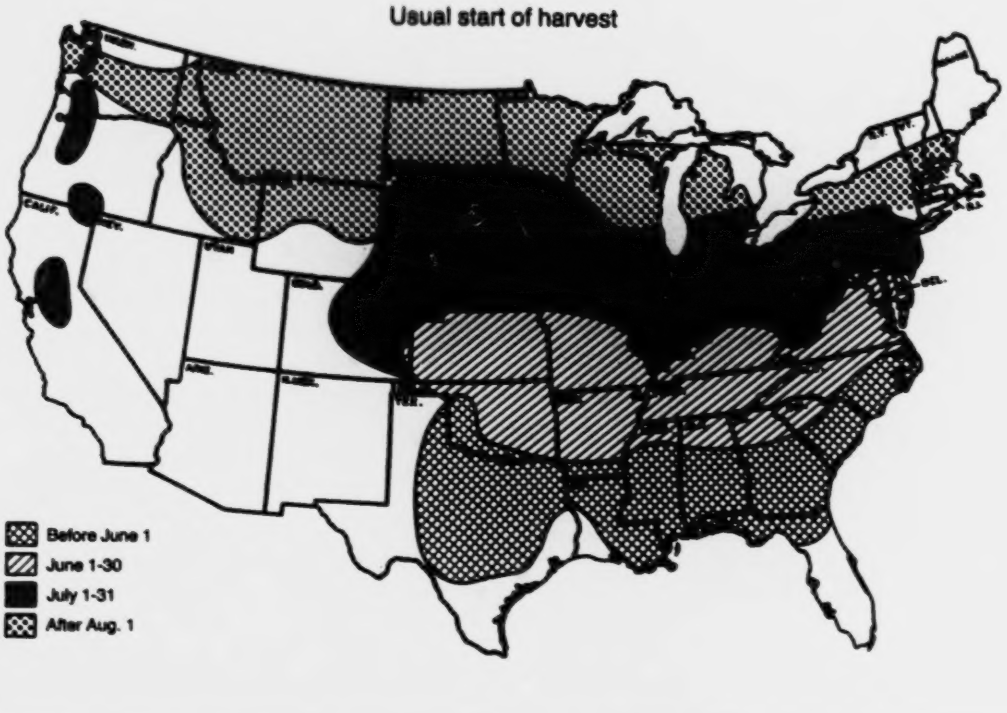
1/ Tennessee's spring-grown oats are mostly grown for use as hay.

Source: (9, pp. 20-21).

Figure 3

Usual planting and harvesting dates of oats


Usual start of planting
Winter sown: Fall
Spring sown: Before Mar. 15
Mar. 16-31
Apr. 1-15
After Apr. 15


Usual start of harvest
Before June 1
June 1-30
July 1-31
After Aug. 1

Source: (9).

plant to produce a grain head. The grain is usually harvested in May or June. A second crop, such as soybeans, is then planted. An alternative to producing grain would be to plant another crop in the spring, such as soybeans or sorghum.

Only 2.7 percent of the U.S. farms producing oats for grain reported using irrigation in 1982, about the same percentage as in 1978 (72, p. 21). Irrigated oats acreage is concentrated in California, Colorado, Idaho, Montana, Nebraska, and Wyoming. During 1982, the average yield per acre for irrigated oats was 68.7 bushels compared with 59.7 bushels for partially irrigated oats and 55 bushels for unirrigated oats (72, p. 20).

Much less fertilizer and lime are used for oats than for corn or wheat. In 1984, fertilizer and lime expenditures for oats were 25 percent of variable expenses, compared with 39 percent for corn and 34 percent for wheat. Nitrogen (N) application rates for oats in 1983 ranged from 7.4 pounds to 35.2 pounds per acre in selected oats-producing States (app. table 1), compared with an average U.S. application rate for corn of 137 pounds per acre. Phosphorus (P) application rates for oats in 1983 ranged from 11.7 pounds to 47.6 pounds per acre compared with an average of 64 pounds per acre for corn. Potassium (K) application rates for oats in 1983 ranged from 0.7 pound to 68 pounds per acre compared with an average of 85 pounds per acre for corn. Lime applications for oats ranged up to as much as 1,012 pounds per acre. Application of manure and trace elements was reported by some States. Application rates of N, P, and K to oats acreage were generally greater in 1983 than 1978 (app. table 2). Recommended fertilizer application rates for oats acreage depends, in part, upon end use, desired yield, soil fertility, and previous crop. State agronomy guides should provide recommended fertilizer usage.

Equipment used for oats production includes soil tillage to harvesting implements. Soil preparation equipment such as plows, discs, harrows, or cultipackers travel over an acre the largest number of times (app. table 3). Harvesting equipment such as swathers, combines, and balers are the next class of machinery that travel most frequently over an acre of oats. The planting operation averages one trip per acre followed by less frequent operations of fertilizer application, rotary mowing, and rock picking.

Labor requirements to produce oats generally do not compete with the major row crops. Spring oats are generally planted 6 weeks ahead of corn or soybeans, but oats may compete with the planting of spring wheat. Oats are harvested in May-July and do not compete with corn or soybean harvest labor but may compete with wheat or barley harvesting.

Characteristics of Oat Farms

In 1982, 281,000 farms harvested oats for grain, about 15.5 percent of the 1.8 million farms with harvested cropland, down about 1 percentage point from 1978 (table 5). The eight leading oats-producing States accounted for 74 percent of the farms producing oats for grain in 1978, dropping to 72 percent in 1982. Oats claimed 2.8 percent of total harvested U.S. cropland in 1982, down 0.4 percentage point from 1978.

Table 5--Relative importance of oats on U.S. farms

Year/ State	Farms with harvested cropland	Cropland harvested per farm	Farms harvesting oats for grain	Acres of oats harvested per farm	Share of farms harvesting oats	Share of cropland harvested for oats
	Thousands	Acres	Thousands	Acres	Percent	Percent
1978:						
Iowa	111	212	40	22	36.0	3.7
Michigan	60	118	19	22	31.7	5.9
Minnesota	99	207	47	14	47.5	8.7
North Dakota	40	494	16	70	40.0	5.7
Ohio	83	124	20	15	24.1	3.0
Pennsylvania	52	81	21	15	40.4	7.2
South Dakota	35	394	23	87	65.7	14.1
Wisconsin	81	121	52	21	64.2	11.1
Eight States	561	190	238	28	42.4	6.2
United States	1,905	166	320	32	16.8	3.2
1982:						
Iowa	104	233	35	23	33.7	3.3
Michigan	59	229	17	24	28.8	5.5
Minnesota	94	229	39	33	41.5	6.5
North Dakota	36	597	13	74	36.1	4.7
Ohio	78	133	18	17	23.1	2.9
Pennsylvania	50	87	19	16	38.0	7.0
South Dakota	33	440	20	92	60.6	12.5
Wisconsin	76	133	41	22	53.9	8.9
Eight States	530	209	202	34	38.1	6.1
United States	1,810	180	281	33	15.5	2.8

Source: (72).

Average oats acreage per farm ranged from 16 acres in Pennsylvania to 92 acres in South Dakota. Farms in South Dakota and North Dakota would be most affected by Government programs designed for oats producers because of large oats acreage harvested per farm in relation to other States (table 5). The distribution of Government payments among oats producers depends mostly on the proportion of total production harvested by each size group. In 1978, 54,792 producers with 50 or more harvested acres accounted for almost 52 percent of all oats grain production (table 6). In 1982, 49,665 producers with 50 or more harvested acres accounted for 54 percent of all grain production. Thus, because payments are proportional to the production base, about 17-18 percent of all producers would receive about 52-54 percent of the benefits.

The tenure system for farmers growing oats for grain ranges from full owners to tenants. In 1982, full owners made up 43 percent of all farms and 32 percent of the production. Part owners totaled 45 percent of all farms and 56 percent of all production. The remaining 12 percent of farmers were tenants, accounting for 11 percent of total oat grain production (72).

Factors Affecting Production Response

Many factors are involved in the production of oats. For example, a farmer must decide whether to plant oats or a competing crop. Once the crop is planted, weather, expected price, cost of harvesting, and end use affect a farmer's decision on how much of the planted crop to harvest. Important variables involved in the production process include acres planted, acres harvested, yield, production, and farm price received. These economic variables, particularly price and quantity relationships, portray the overall supply situation of oats.

Acreage, yield, and production response elasticities for oats are summarized in table 7. The own-price elasticity for oats represents a percentage change in acres, yield, or production due to a 1-percent change in farm price received. The cross-price elasticity represents a percentage change in acres, yield, or production of oats due to a 1-percent change in the farm price received for a competing crop. Cross-price elasticities were not computed for all competing crops because of statistical difficulties. These elasticities were obtained from selected studies found in the literature (5, 20, 21, 24, 75).

Acres Planted

Farmers' planting decisions are generally based on crop profitability. During 1950-85, acres planted to oats trended downward by 1 million acres per year (fig. 4). Planted acreage tended to plateau in the midfifties at about 44 million acres, but it exhibited a pronounced decline to a low of 12.4 million acres in 1984. Acreage planted to oats declined since the midfifties, but area planted to wheat and soybeans has trended upward by 449,000 acres and 1.7 million acres per year (table 8). Corn acreage was trendless during 1950-85; however, the acreage devoted to corn production clearly increased during the seventies.

Although acreage planted to oats has trended downward, generally there has been an inverse relationship between the areas planted to corn and wheat and that planted to oats. As corn and wheat acreage was idled as a supply control

Table 6--Number of farms producing oats and production by size group, 1978 and 1982

Acres of oats harvested for grain	Oats-producing farms				Oats production			
			Share of all oats-producing farms				Share of all oats-producing farms	
	1978	1982	1978	1982	1978	1982	1978	1982
	Number		Percent		1,000 bushels		Percent	
1-4	122,147	106,272	38.2	37.8	51,720	47,149	10.1	9.3
15-24	72,955	63,224	22.8	22.6	72,946	65,784	14.2	13.0
25-49	69,810	61,723	21.8	22.0	123,760	117,276	24.1	23.2
50-99	35,978	31,875	11.3	11.3	118,349	116,202	23.0	23.0
100-249	16,624	15,793	5.2	5.6	109,142	118,073	21.3	23.3
250-499	1,890	1,666	.6	.6	27,895	29,092	5.4	5.8
500 or more	300	331	.1	.1	9,673	12,279	1.9	2.4
All farms	319,744	280,884	100.0	100.0	513,485	505,855	100.0	100.0

Source: (72).

Table 7—Price elasticities for oats [1]

Variables	Own-price		Cross-price
	Low	High	Wheat 2/
	Percent		
Acres planted	0.15	0.56	-0.12
Acres harvested	.16	.16	-.13
Yield	.05	.15	.01
Production [3]	.21	.31	-.13

[1] Elasticities were obtained from (5, 20, 21, 24, 75).

[2] Estimates for 1986 crop year.

[3] Own-price production elasticities were computed by summing elasticities for acres harvested and yield; the cross-price elasticity in relation to wheat was computed directly.

measure, acreage planted to oats tended to rise in 1961, 1970, or 1983 (fig. 4). Oats seeded to idled corn or wheat acreage served as a conservation crop and usually was not harvested for other purposes.

Figure 4

Acres planted to oats, corn, wheat, and soybeans

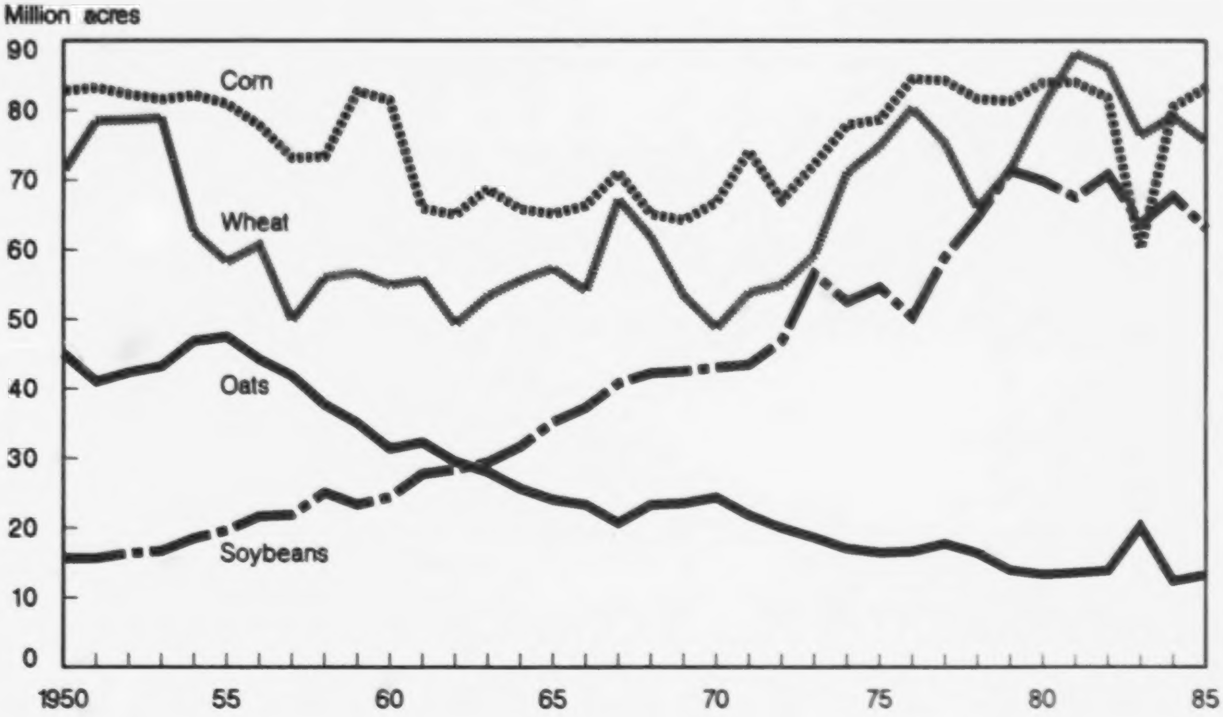


Table 8--Acreage planted to principal U.S. crops

Crop	1933	1943	1953	1963	1973	1985
				1,000 acres		
Oats 1/	43,774	43,467	43,220	28,054	19,147	13,255
Corn, all	109,830	94,341	81,574	68,771	71,912	83,448
Sorghum, all	12,602	17,726	14,590	17,516	19,231	18,285
Barley 1/	14,200	17,474	9,615	13,452	11,229	13,156
Wheat, all 1/	69,009	55,984	78,931	53,452	58,978	75,575
Rye, all 1/	4,714	5,311	3,456	4,376	3,545	2,563
Soybeans, all	3,957	15,428	16,719	29,596	56,675	63,130
Flaxseed	1,837	6,182	4,759	3,379	1,742	620
Dry edible beans	1,895	2,599	1,418	1,404	1,395	1,570
Potatoes	3,496	3,355	1,563	1,337	1,328	1,409
Sugar beets	1,036	619	794	1,285	1,280	1,125
Alfalfa and 2/ mixture hay	12,713	15,518	23,337	28,490	27,787	25,608
All other hay 2/	55,726	61,486	51,660	37,938	34,312	34,815
Sunflowers	NA	NA	NA	NA	NA	3,055
Cotton	40,248	21,900	26,872	14,843	12,480	10,685
Rice	798	1,517	2,204	1,785	2,181	2,512
Peanuts	2,350	5,150	1,846	1,498	1,530	1,490
Popcorn	14	95	242	112	154	NA
Dry edible peas	294	825	277	335	147	NA
Sweetpotatoes	944	870	351	178	118	110
Tobacco 2/	1,739	1,458	1,633	1,176	887	688
Sugarcane 3/	234	304	344	577	741	770
Total	381,140	371,609	365,405	309,554	326,779	342,224

NA = Not available.
1/ Includes acreage planted in preceding fall.
2/ Harvested acreage
3/ Estimated for 1935, the earliest year available.
Source: (19, 69).

Among the factors partially responsible for the decline in oats acreage are the decline in profitability in relation to other cash crops such as soybeans or corn, the decline in oats' use as a feed ingredient, the decline in use within a crop rotation, and the increase in farm enterprise specialization for both crops and livestock. For example, the increased use of corn and soybean meal in livestock rations has contributed to the decline in oats' feed use. A rise in the use of herbicides has lessened the need for oats in crop rotations. In some areas, profitability of growing soybeans compared with oats has contributed to a change in cropping patterns.

The estimated own-price elasticity for oats acreage planted ranged from 0.15 to 0.56 which indicates that a 1-percent increase (decrease) in oats prices received by farmers likely results in a 0.15- to 0.56-percent increase (decrease) in acreage planted (table 7). As a result of a 1-percent rise in wheat price, oats acreage planted tended to decline by 0.12 percent. Although price influences the number of acres planted, oats are generally the least sensitive to changes in price of the feed grains, wheat, soybeans, and cotton.

Acres Harvested for Grain

Factors which affect a farmer's decision to harvest oats acreage for grain include weather, expected yield and price, cost of harvesting, and intended use such as a forage or conservation crop.

Oats acreage harvested for grain has recently been 8-10 million acres annually, down from about 40 million acres in the midfifties. Although oats compete with barley, wheat, and sunflowers for cropland, many producers continue to grow oats because they are involved in livestock production.

During 1950-85, the proportion of acres harvested for grain in relation to total acreage planted ranged from 87 percent to 45 percent (table 9). The decline in oats acreage harvested is due, in part, to its decline in use as a feed grain. Although acreage planted to oats for nongrain purposes declined from 5.7 million acres to 4.2 million acres, this decline was not as great as the decline in acreage harvested for grain. Apparently other uses for oats such as a forage, pasture, conservation, or as a companion crop are gaining in relation to the use of oats solely for grain.

The own-price elasticity for oats acreage harvested was estimated to be 0.16 (table 7). The cross-price elasticity with wheat was -0.13. As mentioned previously, cross-price elasticities could not be computed for the other competing crops.

Yields

Crop yields depend upon a number of direct and interacting factors that are economic, environmental, and biological. Major factors include land and seed quality, cultural practices, agricultural chemicals, machinery quality, labor, fertilizer, and weather.

Factors that explain yields have been measured in many different ways. Land quality has usually been measured by the level of planted or harvested acres. As acres devoted to a specific crop increase, quality in general deteriorates and therefore yields can usually be expected to decline. The level of acreage idled has also been used to represent Government land retirement programs.

Seed quality and cultural practices have improved over time. Effects of these factors can be represented by time trend variables. Chemicals, machinery, labor, and fertilizer have been represented by production expenses per acre, an index of prices paid, or a specific input price or quantity. Weather has been measured by specific variables such as rainfall and temperature during the growing season.

Table 9—Oats acreage planted, harvested, and used for other purposes

Year	Planted	Harvested for grain		Used for other purposes	
		Area	Share of planted	Area	Share of planted
	1,000 acres	1,000 acres	Percent	1,000 acres	Percent
1950	45,044	39,306	87	5,738	13
1951	41,015	35,233	86	5,782	14
1952	42,341	37,012	87	5,329	13
1953	43,220	37,536	87	5,684	13
1954	46,898	40,551	86	6,347	14
1955	47,494	39,027	82	8,467	18
1956	44,205	33,333	75	10,872	25
1957	41,840	34,065	81	7,775	19
1958	37,699	31,247	83	6,452	17
1959	35,064	27,758	79	7,306	21
1960	31,419	26,588	85	4,831	15
1961	32,314	23,886	74	8,428	26
1962	29,500	22,377	76	7,123	24
1963	28,054	21,308	76	6,746	24
1964	25,634	19,759	77	5,875	23
1965	24,046	18,522	77	5,524	23
1966	23,343	17,877	77	5,466	23
1967	20,719	16,110	78	4,609	22
1968	23,342	17,708	76	5,634	24
1969	23,561	17,971	76	5,590	24
1970	24,410	18,594	76	5,831	24
1971	21,831	15,705	72	6,184	28
1972	19,990	13,410	67	6,653	33
1973	18,605	13,770	74	4,835	26
1974	17,013	12,608	74	4,405	26
1975	16,434	13,038	79	3,396	21
1976	16,620	11,834	71	4,786	29
1977	17,732	13,485	76	4,247	24
1978	16,407	11,126	68	5,281	32
1979	13,960	9,682	69	4,278	31
1980	13,381	8,657	65	4,725	35
1981	13,632	9,407	69	4,225	31
1982	13,951	10,258	74	3,693	26
1983	20,289	9,072	45	11,217	55
1984	12,414	8,163	66	4,251	34
1985	13,255	8,177	62	5,078	38

Source: (69).

Oats grain yields trended upward during 1950-85 by 0.7 bushel per acre per year (fig. 5). Oats yields increased from 34.8 bushels per acre in 1950 to a record 63.7 bushels by 1985. State oats yields in 1985 ranged from a low of 33 bushels per acre in Montana to 92 bushels in Oregon.

The trend in oats yield gains has ranked fourth among the feed grains, wheat, and soybeans. Yields for corn, sorghum, and barley rose annually by 2.2, 1.2, and 0.83 bushels, respectively. Yields for wheat and soybeans rose annually by 0.58 and 0.31 bushels, respectively.

Oats ranked last among the feed grains in yield gain due to a number of factors: irrigation is not a common production practice compared with corn; commercial fertilizer is used on only 35-40 percent of the harvested acres; oats acreage has shifted from high- to low-quality land in the Corn Belt and Great Plains regions due to the expansion of soybean and wheat acreage; and oats' decline as a major feed grain has led to reduced plant breeding and production practice research. Only one private company currently conducts oats breeding research.

Most agronomic research on oats during the past several decades was conducted at land-grant universities with some private funding. The release of new oats varities has accounted for about 60 percent of yield gains (7, 34, 44, 76). That estimate compares favorably with other self-pollinating crops: 50-60 percent for winter wheat, 40-90 percent for barley, and 50-90 percent for soybeans. Improved management and cultural practices were attributed to the remaining 40 percent of annual oats yield gains.

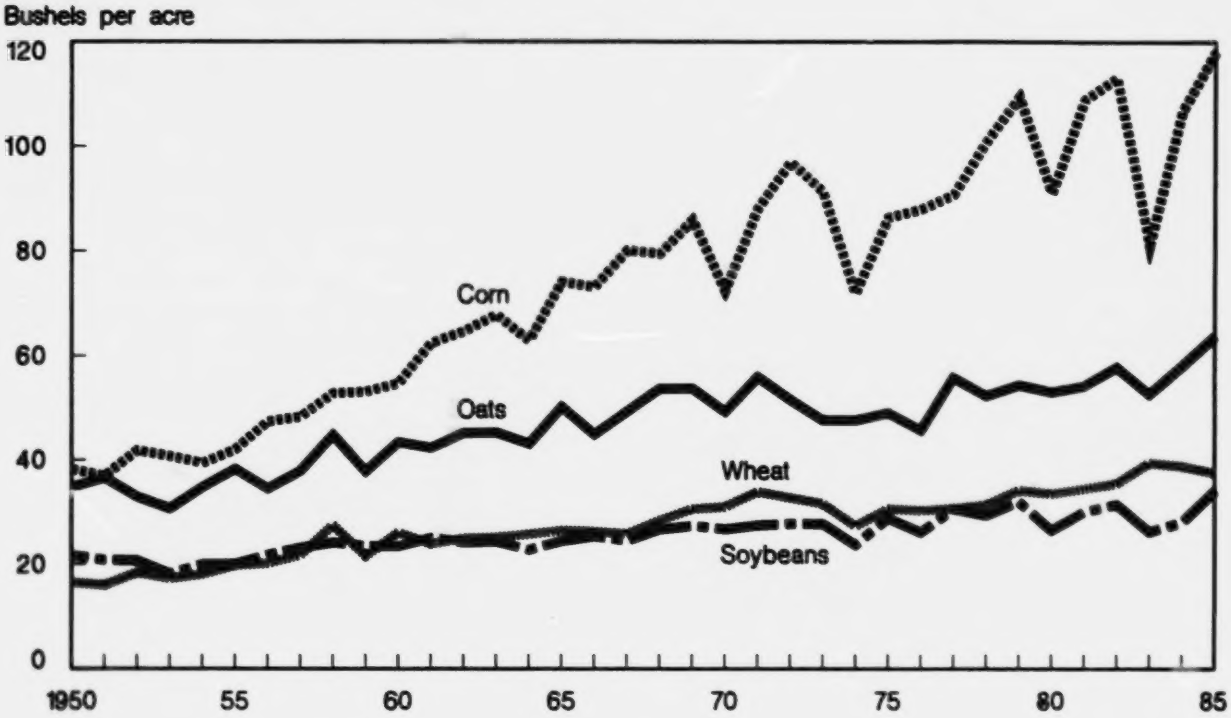
Research programs to improve oats varieties have been underway for many years; for example, Iowa State University's program began in 1906. These programs are generally designed to increase the agronomic potential--high yield, low lodging, high test weight, and early heading--and to improve resistance to rust and other diseases. Although the agronomic potential has improved, the plant's resistance to rust and other diseases has tended to decline over time. For each oats variety resistant to rust, the crown rust fungus appears able to produce a race which can attack that variety. This cycle takes about 5 years. Thus, new varieties resistant to rust or methods to combat rust are in demand.

Popular oats varieties used in recent years include Lyon-Minnesota, Otana-North Dakota, Burnett-South Dakota, and Long and Multiline E-Iowa. Ogle is a relatively new variety with strong agronomic characteristics. It yields about 100 bushels to the acre and has a test weight of 47 pounds per bushel. This variety provides a good milling yield. However, its resistance to rust and smut needs improvement. This variety can be grown in the Corn Belt, the Northeast and North Central States, and southern Ontario, Canada.

Another new variety with good agronomic features is Steele. This variety is more suited to a specific region than Ogle, especially the North Central States and Canada. Steele is resistant to crown and stem rust and barley yellow rust, and it provides a high yield with good protein.

Oats yields have been fairly unresponsive to price (table 7). Estimates of yield price elasticities range from 0.05-0.15 percent.

Figure 5
Yield per acre for oats, corn, wheat, and soybeans



Production

Own-price production elasticities were computed by summing elasticities for acres harvested and yield, assuming little or no effect of a change in oats acreage on yield. The own-price elasticity of oats production has been fairly inelastic with estimates ranging from 0.21-0.31 percent (table 7). Thus, changes in total production appear more responsive to factors other than price.

DEMAND

The quantity of oats consumed as grain has steadily declined since the 1950's. This decline was due, in part, to a decrease in the number of animals consuming oats, an increase in profitability of other feed grains and soybeans, and a decrease in oats' use as a rotation crop. Onfarm consumption has dropped most. The off-farm component of feed use, oats used by feed manufacturers and fed by livestock and poultry producers, has declined less rapidly. Total feed use of oats generally accounts for about 85 percent of total disappearance, down from 90 percent in 1950 (table 10). Food use of oats has been a small, but steady, component of demand. Seed use has declined with the drop in acreage planted. U.S. oats exports have been relatively small but highly variable.

Table 10—Consumption of U.S. oats

Crop year 1/	Food	Seed	Feed and residual	Total domestic consumption	Exports	Total disappearance
			Million bushels			
1950	33.5	100.0	1,176.4	1,309.9	6.4	1,316.3
1951	34.5	105.0	1,209.0	1,348.5	5.1	1,353.6
1952	34.0	108.0	1,178.9	1,320.9	4.2	1,325.1
1953	32.8	118.0	1,101.2	1,252.0	3.6	1,255.6
1954	34.1	119.0	1,178.8	1,331.9	12.4	1,344.3
1955	34.5	111.1	1,277.7	1,423.3	30.2	1,453.5
1956	36.5	105.0	1,124.9	1,266.4	28.1	1,294.5
1957	37.5	95.0	1,056.4	1,188.9	26.6	1,215.5
1958	41.0	88.0	1,193.1	1,322.1	30.2	1,352.3
1959	42.0	79.0	1,009.1	1,130.1	46.0	1,176.1
1960	42.5	82.0	934.0	1,058.5	31.9	1,090.4
1961	43.6	75.0	929.5	1,048.1	15.8	1,063.9
1962	45.2	71.0	878.3	994.5	29.9	1,024.4
1963	45.1	65.2	815.3	925.6	6.0	931.6
1964	45.4	60.5	783.6	889.5	4.6	894.1
1965	45.1	59.8	741.5	846.4	34.0	880.4
1966	43.7	53.4	748.7	845.8	21.8	867.6
1967	40.9	60.0	686.2	787.1	11.4	798.5
1968	40.6	60.1	735.3	836.0	8.4	844.4
1969	41.3	62.2	735.9	839.4	5.2	844.6
1970	40.8	56.1	778.4	875.3	18.7	894.0
1971	42.7	51.5	740.1	834.3	20.8	855.1
1972	45.2	47.9	715.3	808.4	18.6	827.0
1973	45.4	43.7	669.4	758.5	56.7	815.2
1974	43.6	42.4	579.8	665.8	18.7	684.5
1975	44.0	42.7	558.5	645.2	13.7	658.9
1976	42.4	45.9	484.4	572.7	9.6	582.3
1977	42.0	42.5	509.4	593.9	12.3	606.2
1978	41.0	36.1	525.7	602.8	12.7	615.5
1979	40.7	34.6	491.8	567.1	4.1	571.2
1980	41.0	33.0	432.2	506.2	13.3	519.5
1981	41.2	35.4	453.0	529.6	6.6	536.2
1982	41.7	43.3	440.6	525.6	3.0	528.6
1983	40.9	36.6	466.2	543.7	2.1	545.8
1984	41.0	33.2	433.4	507.6	1.3	508.9
1985	44.0	39.0	459.8	542.8	2.2	545.0

1/ Reflects June through May crop year.
Source: (60).

Feed

Less than 500 million bushels of oats have been used for feed annually since 1978, less than 50 percent of that fed in the 1950's. Oats account for only about 5 percent of total volume of grains fed to livestock and poultry.

Oats are most often fed on farms where grown. Thus, a sizable share of each crop is marketed in the form of animal products. The market value can be doubled or tripled in this manner. More recently, onfarm feeding of oats has declined as farms have become more specialized and animal feeding has become more concentrated outside the traditional oats-producing regions.

Oats are principally fed to dairy cattle, horses, mules, replacement layers, and turkeys, with lesser quantities fed to hogs, beef cattle, and sheep (fig. 6). Milk cows, horses, and mules account for about 65 percent of oats fed, compared with 54 percent in 1950. Consumption of oats declined along with the drop in population of work horses, a major consumer of oats.

Feed use of oats has trended downward since the midfifties due, in part, to the declining numbers of dairy cattle and lighter weight of recreational horses. Feed use of oats is usually positively related to the number of animal units, especially horses and dairy cattle. However, the numbers of horses and mules have risen recently primarily because of an increase in recreational horses. Because of the lighter weight of recreational horses, feed consumption per head has trended downward, offsetting the effect of an increasing number of recreational horses. For a while the expanding dairy and poultry industries kept oat feed use above a billion bushels. Since about 1960, however, the concentration of livestock and poultry operations into larger units encouraged substitution of cheaper byproduct protein feeds for oats (fig. 7).

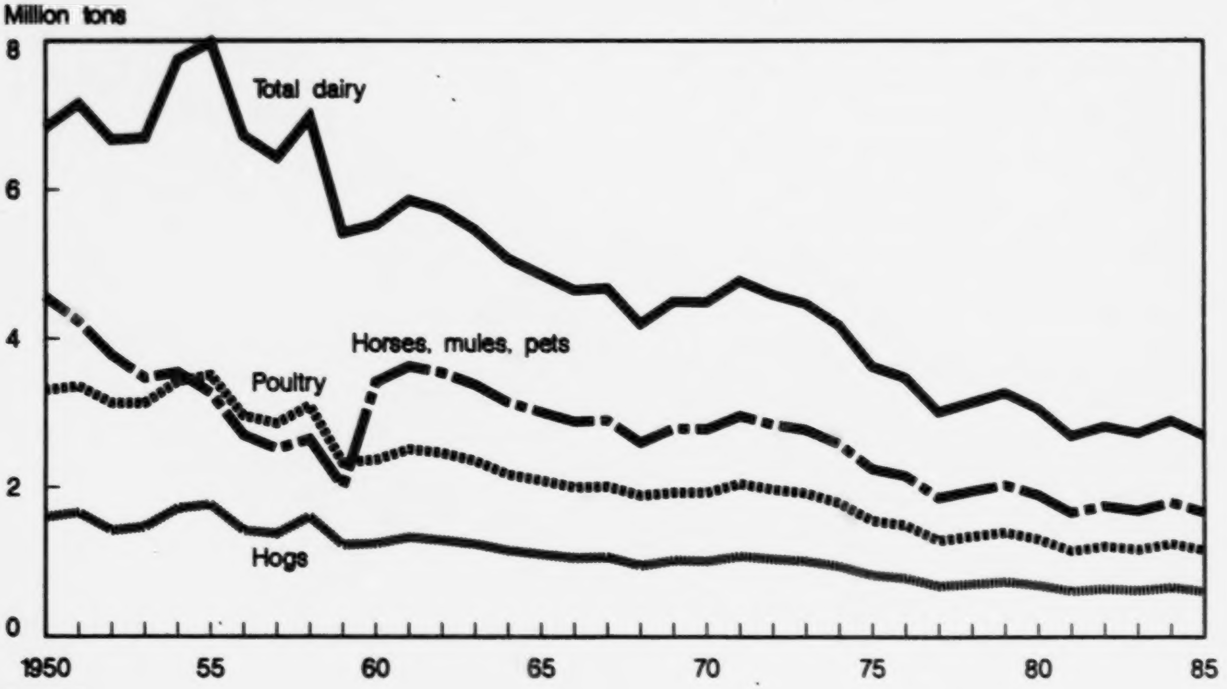
Feed Use Characteristcs

Oats are a good source of protein, fiber, and minerals. They have more protein per pound than corn, but fewer calories (table 11). With a lower energy content, oats are not as good for finishing or fattening animals as corn. Oats form a loose mass in the stomach. Some grains, such as wheat, tend to pack the stomach which may cause digestive problems. Oats are a preferred feed for animals such as horses and breeder show cattle which must be maintained for long periods of time and kept in good condition.

Hulled oats (groats) contain the highest protein level of the major cereal crops, but oilseed meals and grain byproduct feeds are more economical sources of protein. The rapid rise in soybean output since 1950 has significantly diminished the value of oats as a protein source in feed rations. However, newer oats varieties have increased protein content, and oats could become more competitive. Although oats are a low-cost grain protein, some physical characteristics such as bulk, digestability, and palatability may affect their substitutability with some livestock species. Also, the percentage of oats fed in the total ration can alter their caloric value. For example, when fed to milk cows, oats have an energy level of 80 therms (megacalories) per hundredweight (cwt) in concentrations of less than 25 percent, but, when used as the principal feed, the value drops to 72 therms per cwt (29, p. 110).

Figure 6

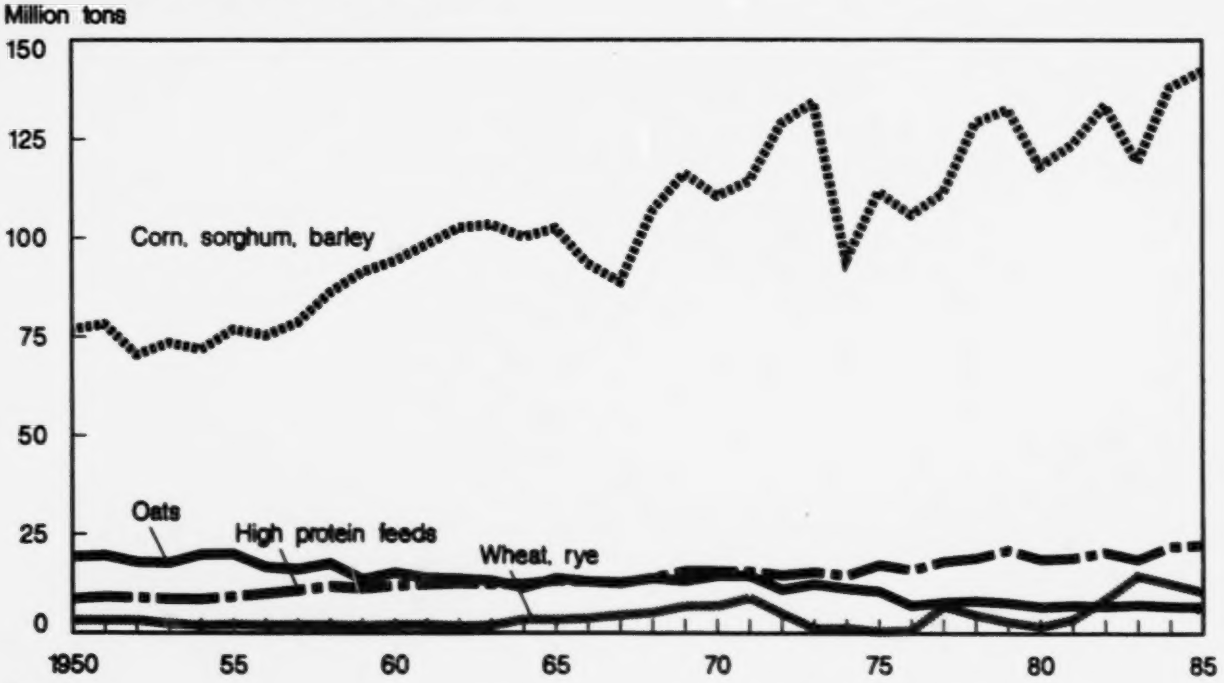
Oats fed to selected livestock and poultry



Source: (2).

Figure 7

Feed consumption of oats, other grains, and high protein feeds



Source: (3).

Table 11—Partial analysis of selected feedstuffs 1/

Feedstuff	Crude protein	Crude fiber	Metabolizable energy in— 2/ Ruminants	Swine	Poultry	Horses
	- - Percent - -		Mcal per pound	Kcal per pound	Kcal per pound	Mcal per pound
Barley 3/	12.2	5.0	1.19	1,244	1,117	1.03
Corn, dent yellow 3/	9.6	2.1	1.34	1,306	1,532	1.14
Milo 3/	10.6	2.3	1.28	1,273	1,485	n.a.
Oats 3/	12.1	10.9	1.08	1,201	1,157	.98
Wheat, soft red winter	11.5	2.1	1.27	1,410	1,334	1.09
Soybean meal, solvent extracted (44-percent protein)	40.3	6.3	1.21	1,402	1,031	n.a.
Wheat middlings, less than 9.5 percent fiber	16.7	6.9	1.20	1,235	950	n.a.
Corn gluten feed	23.6	8.7	1.22	1,149	769	.97

n.a.=not applicable.
1/ All numbers are on an as-fed basis.
2/ Kcal=1,000 calories; Mcal=1 million calories.
3/ All analyses.
Source: (17).

The hull has a certain value in poultry feeding. Although nonnutritious, the hull reduces feather picking and cannibalism in growing and laying flocks (29, p. 110). Pullets consume less corn, do not get as fat, and reach maturity in better laying condition when fed oats on a restricted basis. Oats also have a tranquilizing effect on hens or turkeys, which helps keep them on feed during the hot summer months.

Hogs prefer groats to corn but do not like the taste of whole oats. Ground whole oats as part of a balanced ration appear to be the most feasible way to incorporate oats into hog rations. During gestation, the percentage of oats is increased to prevent the sow from gaining too much weight. Nursing pigs and starting pigs are fed rolled oats and groats.

Horses and mules prefer oats to any other grain. Although other grains can be substituted, horse owners will pay a premium to obtain high-quality oats. Oats are easily digested but may be too bulky and not give enough energy.

Food

Human consumption has been a rather stable component of oats disappearance, ranging in absolute value from 32.8 million bushels in 1953 to 45.4 million bushels in 1964 and 1973. The food component's proportion of total disappearance ranged from 2.4 percent in 1955 to 8 percent in 1984.

Recent per capita consumption of oats was slightly above 3 pounds per year, much less than wheat's 115-120 pounds per year (table 12). Human consumption of oats was only 1-3 percent of total cereal grain consumption. This percentage has declined to 1 percent since the early sixties because of the increased use of corn in the form of corn sweeteners.

Products which account for the disappearance of oats within the food category include oatmeal, oat flour, natural cereals, meat product extenders, cookies and breads, granolas, and baby food. Oats flour is used in certain cosmetics and cereal applications and as an antioxidant in food products. Oats are principally consumed as a breakfast food or snack product. Although published data are not available, industry sources estimate that 50 percent of the total is used as standard oatmeal, 35 percent as instant oatmeal, 5-10 percent as oat flour, and 5-10 percent as snack products.

Oatmeal accounts for over 70 percent of all cooked cereals consumed in the United States each year. Although most Americans prefer cold cereals, hot cereals are valued because they are nutritious, inexpensive, and readily digestible. People over 65 and children under 5 are the largest consumers of hot cereals. In recent years, population increases in these age groups have boosted sales.

Consumption of oats food products has remained fairly stable, but the product mix has changed over the past 20 years. The popularity of granola cereals, snacks, and instant oatmeal has offset any long-term drop in consumption of standard rolled oats (30). Growth of all products is projected at about 2 percent per year according to industry sources.

Oats are one of the most nutritious cereals, high in protein and fiber. The protein content of rolled oats is 18.8 percent, greater than that found in other cereal grains. Many of the vitamins and minerals found in oats are contained in their bran and germ. Most oat food products use the entire grain while wheat and rice products lose nutritional components during the milling process. The retention of germ and bran in oats contributes to the nutritional value.

Recent medical research has shown that certain fibrous plant materials in the diet can lower serum cholesterol concentrations (4). The fibers, however, must be water soluble. Oat bran is water soluble; wheat bran is not. Water-soluble dietary fibers also lower post-meal blood glucose levels in insulin-dependent diabetics. Thus, oat bran or whole oats could play a major role in improving health through diet.

Oats consumption by humans may increase, if U.S. diets shift toward more cereal-based foods and away from fatty, high-protein, animal-based foods.

Seed

Seed use is a relatively small proportion of total disappearance, 7-9 percent of annual disappearance during 1950-85. Since 1950, total seed use has trended downward because of the decline in acres planted.

Table 12—Per capita consumption of flour and cereal products by selected commodities

Year	Wheat	Corn 1/	Rice	Oats	Rye	Barley	Total
				Pounds			
1950	135.0	31.5	5.1	3.3	1.5	1.4	177.8
1951	133.0	30.0	5.8	3.3	1.5	1.4	175.0
1952	131.0	28.9	5.3	3.3	1.5	1.3	171.3
1954	126.0	27.7	5.3	3.2	1.4	1.1	164.7
1955	123 0	27.6	5.5	3.3	1.4	.1	161.8
1956	121.0	27.1	5.8	3.3	1.3	.1	159.5
1957	119.0	26.4	5.7	3.4	1.2	.1	156.7
1958	121.0	27.8	5.4	3.6	1.2	.1	160.0
1959	120.0	27.4	.5	3.6	1.2	.1	158.2
1960	118.0	28.1	6.1	3.6	1.1	1.1	158.0
1961	118.0	28.5	6.2	3.6	1.1	1.1	158.5
1962	115.0	29.8	7.4	3.7	1.1	1.1	158.1
1963	113.0	31.3	6.6	3.7	1.1	1.1	156.8
1964	114.5	31.2	7.1	3.6	1.1	1.1	158.6
1965	113.3	31.8	7.6	3.4	1.2	1.1	158.4
1966	112.0	32.0	7.3	3.3	1.2	1.1	156.9
1967	113.0	32.6	7.5	3.2	1.2	1.3	158.8
1968	112.8	33.2	7.9	3.2	1.3	1.3	159.7
1969	112.5	34.2	8.3	3.2	1.2	1.2	160.6
1970	110.8	34.5	6.7	3.2	1.2	1.2	157.6
1971	110.5	35.7	7.6	3.2	1.1	1.2	159.3
1972	119.8	35.9	7.0	3.2	.1	1.2	168.1
1973	112.8	38.5	.7	3.2	1.3	1.2	164.0
1974	110.9	41.1	7.5	3.2	1.2	1.2	165.1
1975	114.5	45.0	7.6	3.2	.1	1.2	172.5
1976	119.1	48.3	7.1	3.2	.8	1.2	179.7
1977	115.5	51.1	7.5	3.2	.8	1.1	179.2
1978	115.2	54.8	5.7	3.2	.8	1.1	180 8
1979	117.2	59.1	9.4	3.1	.7	1.1	190.6
1980	116.9	64.2	9.4	3.1	.7	.1	195.3
1981	115.9	68.9	.1	3.1	.7	.1	200.6
1982	119.6	75.2	11.8	3.1	.6	.9	211.2
1983	116.1	80.8	9.8	3.1	.7	.9	211.4
1984	117.8	88.7	8.6	3.1	.8	.9	219.9

1/ Includes corn sugar and corn syrup.
Source: (8).

The average seeding rate is 2-3 bushels per acre. Seeding rates differ depending upon the plant's intended use. For example, recommended seeding rates in Minnesota for grain are 2-2.5 bushels per acre and, when used as a nurse crop to establish alfalfa, 1.5-2 bushels per acre. The seeding rate for pasture is generally greater, 3-4 bushels per acre, than the rate for grain or companion crops (25, pp. 3-5). Thus, the optimal plant population depends upon intended use of the plant and other factors, such as variety planted, climatic conditions, or production practices.

Exports

Exports of oats have been a variable, low-volume, and unreliable component of total disappearance. Physical quantities exported ranged from 1.6 million bushels to 56.7 million bushels during 1950-85. The export proportion of total disappearance ranged from 0.3 percent in 1953 and 1985 to 7 percent in 1973.

Other grains rely on exports to clear their market, but oats apparently do not. Since the midseventies, exports of oats have trended downward, possibly because of higher U.S. prices in relation to world prices and the higher value of the dollar in recent years. However, the Food Security Act of 1985, with provisions meant to make U.S. commodities more competitive in the export market, could change this trend.

Ending Stocks

Ending stocks of oats ranged from 164 million bushels in 1976 to 571 million in 1970 (table 13). These stocks are generally positively correlated with production unless there is a strong surge in demand. Their composition consists of free, farmer-owned reserve (FOR), and Commodity Credit Corporation (CCC) stocks. Most of the ending stocks are in the free category, although Government stocks tend to increase when prices decline.

The stocks-to-use ratio, a general measure of a sector's supply and demand situation, ranged 23-70 percent during 1950-85 (fig. 8). A smaller percentage would indicate a tight supply and demand situation; a larger percentage would indicate a greater supply in relation to use.

The supply and demand situation for oats was generally balanced during 1950-85, except for 1965, 1968-72, and 1977-78. These periods had stocks-to-use ratios equal to or greater than 43 percent, peaking at 70 percent in 1971 (stocks equaled 5-8.5 months of disappearance). Also, during the early 1950's this ratio declined to a low of 23 percent. Stocks-to-use ratios for the remaining years ranged 25-42 percent (stocks equaled about 3-5 months of disappearance).

In general, the lowest stocks-to-use ratio since 1950 was about 25 percent, an equivalent of 3 months disappearance. If 2 months are added to this figure for variation, a normal ratio would range from 25-42 percent. The stocks-to-use ratio for corn has usually been much lower (8-33 percent) but more variable, and the similar ratio for wheat is larger than for oats.

Prices generally fell during the periods of excess supply in 1965, 1968-72, and 1977-78 (fig. 8). A combination of increased consumption and fewer acres planted produced a more balanced situation over time. Since exports do not

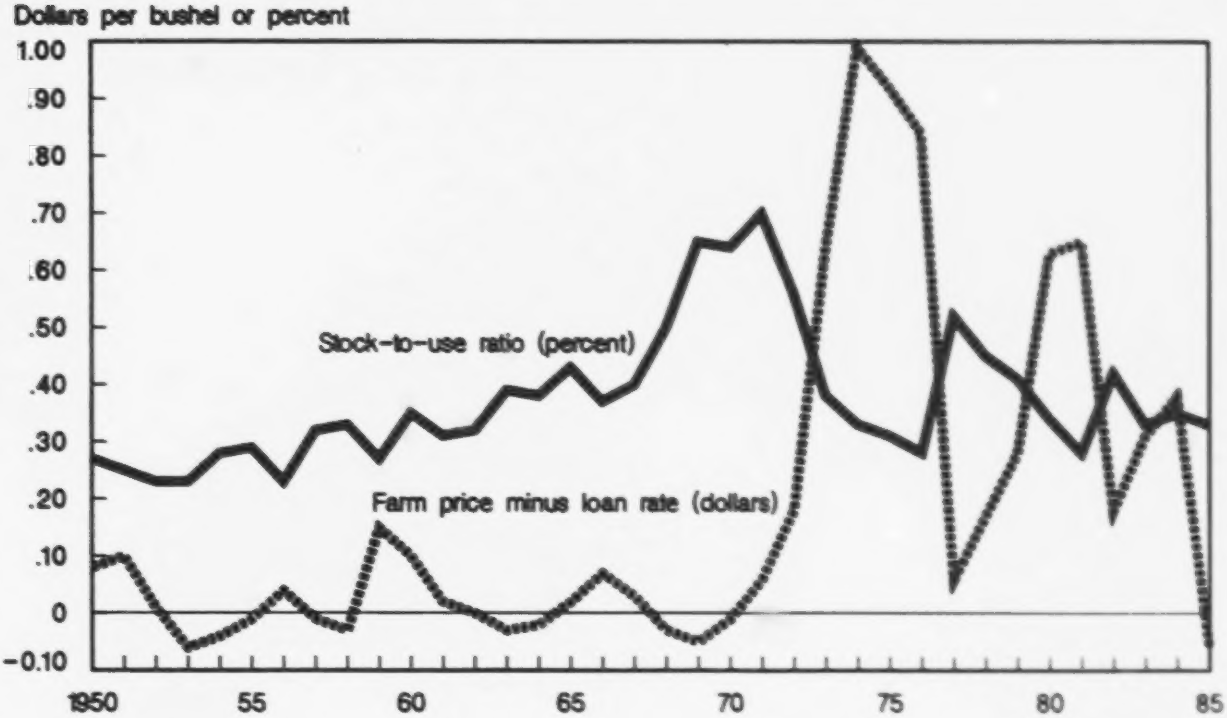
Table 13--Ending stocks of oats, farm price received, and loan rate

Crop year 1/	Ending stocks 2/				Price received	Loan rate
	CCC	FOR	Free	Total		
	Million bushels				Dollars/bushel	
1950	9	0	352	361	0.788	0.71
1951	5	0	336	341	.820	.72
1952	13	0	295	308	.789	.78
1953	16	0	269	285	.742	.80
1954	41	0	333	374	.714	.75
1955	59	0	362	421	.600	.61
1956	27	0	265	292	.686	.65
1957	27	0	364	391	.605	.61
1958	42	0	404	446	.578	.61
1959	15	0	307	322	.646	.50
1960	9	0	377	386	.599	.50
1961	14	0	320	334	.642	.62
1962	17	0	308	325	.624	.62
1963	28	0	335	363	.622	.65
1964	42	0	283	325	.631	.65
1965	40	0	338	378	.622	.60
1966	43	0	274	317	.666	.60
1967	45	0	271	316	.659	.63
1968	47	0	377	424	.598	.63
1969	81	0	467	548	.584	.63
1970	143	0	428	571	.623	.63
1971	184	0	413	597	.604	.54
1972	158	0	305	463	.724	.54
1973	95	0	213	308	1.18	.54
1974	58	0	166	224	1.53	.54
1975	25	0	180	205	1.45	.54
1976	0	0	164	164	1.56	.72
1977	0	28	285	313	1.09	1.03
1978	3	39	238	280	1.20	1.03
1979	3	33	200	236	1.36	1.08
1980	2	0	175	177	1.79	1.16
1981	1	0	151	152	1.89	1.24
1982	1	5	214	220	1.49	1.31
1983	1	4	176	181	1.67	1.36
1984	1	3	176	180	1.69	1.31
1985	2	1	180	183	1.25	1.31

1/ Reflects June through May crop year.
2/ CCC = Commodity Credit Corporation. FOR = Farmer-owned reserve.
Source: (60).

Figure 8

Relationship of oats supply, demand, and price



play a large role in the total disappearance of oats, surplus production that is removed through consumption is done so through domestic consumption. Government programs were also used during periods of supply and demand imbalance as will be seen in a later section.

Factors Affecting Demand

Some of the more important factors affecting the demand for oats are market prices for oats, prices of commodities that substitute for oats, income, population, prices of livestock, and numbers of livestock. Because there are different components of demand, not all of the above factors will apply to each component.

Oats price elasticities for individual demand components are summarized in table 14. These elasticities were obtained from selected studies found in the literature. The own-price elasticity for oats represents a percentage change in feed, food, or seed consumption, stocks, or total consumption due to a 1-percent change in farm price.

The cross-price elasticity represents a percentage change in feed, food, or seed consumption, stocks, or total consumption of oats due to a 1-percent change in the farm price received for a competing crop.

Table 14—Oats price elasticity of demand

Demand variables	Range: Low	Range: High
	Percent	
Feed	-1.07	-1.27
Food	- .08	- .11
Seed	- .05	- .14
Stocks	- .44	-1.53
Total domestic	-1.05	-1.05

Source: (5, 20, 21, 24, 75)

Feed Consumption

Factors affecting oats feed consumption include the farm price of oats, the price of substitutes such as corn or soybean meal, and the price of the output such as milk, horses, or poultry (40). Other factors such as livestock numbers are useful in estimating oats feed consumption. Economic and other phenomena that occur only periodically are also important.

Competition among feed ingredients depends upon relative prices and relative feed value. Feed value on a bushel-for-bushel basis differs from a pound-for-pound basis because of the difference in legal weights per bushel. The average feed values for the major grains, averaged for all livestock classes assuming a reasonably balanced ration, are shown below (35):

Feed value in relation to corn

	Bushel basis	Pound basis
Wheat	113	105
Corn	100	100
Sorghum	95	95
Barley	77	90
Oats	51	90

Substitutability between oats and other feed grains is quite stable because oats prices closely follow the movement of corn prices. Also, the price of oats is generally higher in relation to feeding value than the prices of other feed grains. Oats are often sold at a premium because of their special feeding characteristics. The variation in feed use reflects adjustments made by livestock and poultry producers in response to relative prices and availability of oats and competing feed grains.

The own-price elasticity for oats feed consumption was slightly elastic, ranging in value from -1.07 to -1.27. Thus, for a 1-percent increase (decrease) in the price of oats, feed consumption would decrease (increase) by 1.07-1.27 percent.

Food Consumption

Factors affecting the human consumption of oats include the price of oats, prices of substitute food products, income, population, and tastes and preferences. Price changes have little effect on consumption because of demand inelasticity (-0.08 to -0.11). Population growth has been the major reason for increased food consumption of oats. More recently, health concerns and new products could further increase oats consumption.

Seed Consumption

Seed consumption is affected by factors such as expected planted acreage and current oats price. The price elasticity for seed consumption is very inelastic, and thus price has less effect upon consumption than upon acreage planted.

Ending Stocks

Ending stocks are affected by such factors as the current price of oats, previous year's ending stocks, and current production. The price elasticity of stocks ranged from -0.44 to -1.53, suggesting a wide range in estimates.

Total Consumption

Total consumption of oats is a function of all of the aforementioned variables. The own-price elasticity for the total consumption of oats was about -1.05, which is only slightly elastic.

MARKETING SYSTEM

The marketing system for oats provides services such as assembly, handling, storage, grading and inspection, transportation, and processing. About 40 percent of the grain produced enters the commercial marketing system and requires these services. The remaining 60 percent is used on the farm where it is produced. During 1983, the farmers' most important marketing channel was the country elevator, followed by other farmers. Assembly of oats into economical sizes for transportation and processing is one function provided by country and terminal elevators. Most oats are stored by farmers, with the remainder being stored by elevators and processors. The Federal Grain Inspection Service administers and supervises the official U.S. inspection system. Most intrastate shipments are by trucks, and interstate shipments are usually by rail. Processing services are divided between feed (80 percent) and food (20 percent).

Demand for oats grain is largely a derived demand with intermediate products and processes separating the final consumer from the producer of the raw commodity. The product's value increases at each successive stage of the marketing chain from farmers to consumers. The price difference between the farm and consumer equals the marketing margin which is the sum of value added at each stage of processing. The marketing margin gives an incentive for performing the marketing activities necessary to turn oats grain into a feed ingredient, furfural, oatmeal, or other products. End use prices and marketing costs transmit price signals back to the farmer who in turn can adjust production.

Overview of Marketing Flows

In recent years, an estimated 35-40 percent of oats grain entered commercial marketing channels, representing only 22-25 percent of the total acres planted to oats, based on the 1984 marketing year.

Avenues of entry into the marketing system include local elevators, terminal elevators, processors, dealers, other farmers and ranchers, feedlots, and processors (fig. 9). During 1983, the farmer's most important marketing channel for oats was the local country elevator followed by other farmers (table 15). These results were similiar to 1977 data shown in table 16, except that the volume shipped to local elevators appears to be shifting to other farmers or dealers. These marketing channels differed somewhat by individual States. For example, grain dealers or other farmers were the most important marketing channels in 1983, followed by local elevators in Montana, New York, and Pennsylvania. In 1977, farmers in California, Michigan, and Ohio marketed 100 percent of their grain through local elevators, whereas Texas farmers marketed only 15 percent of their grain through elevators with 49 percent going to dealers and 35 percent to other farmers and ranchers.

Services provided by the commercial market include assembling, storing, inspecting and grading, merchandising, financing, transporting, and processing. In general, the local country elevator is the main marketing link between the farmer and initial consumption point because many of the above functions are performed or coordinated at the country elevator. Because the quantity of oats entering the commercial market is generally declining, revenues generated by providing these marketing services will also probably decline.

Assembly and Storage

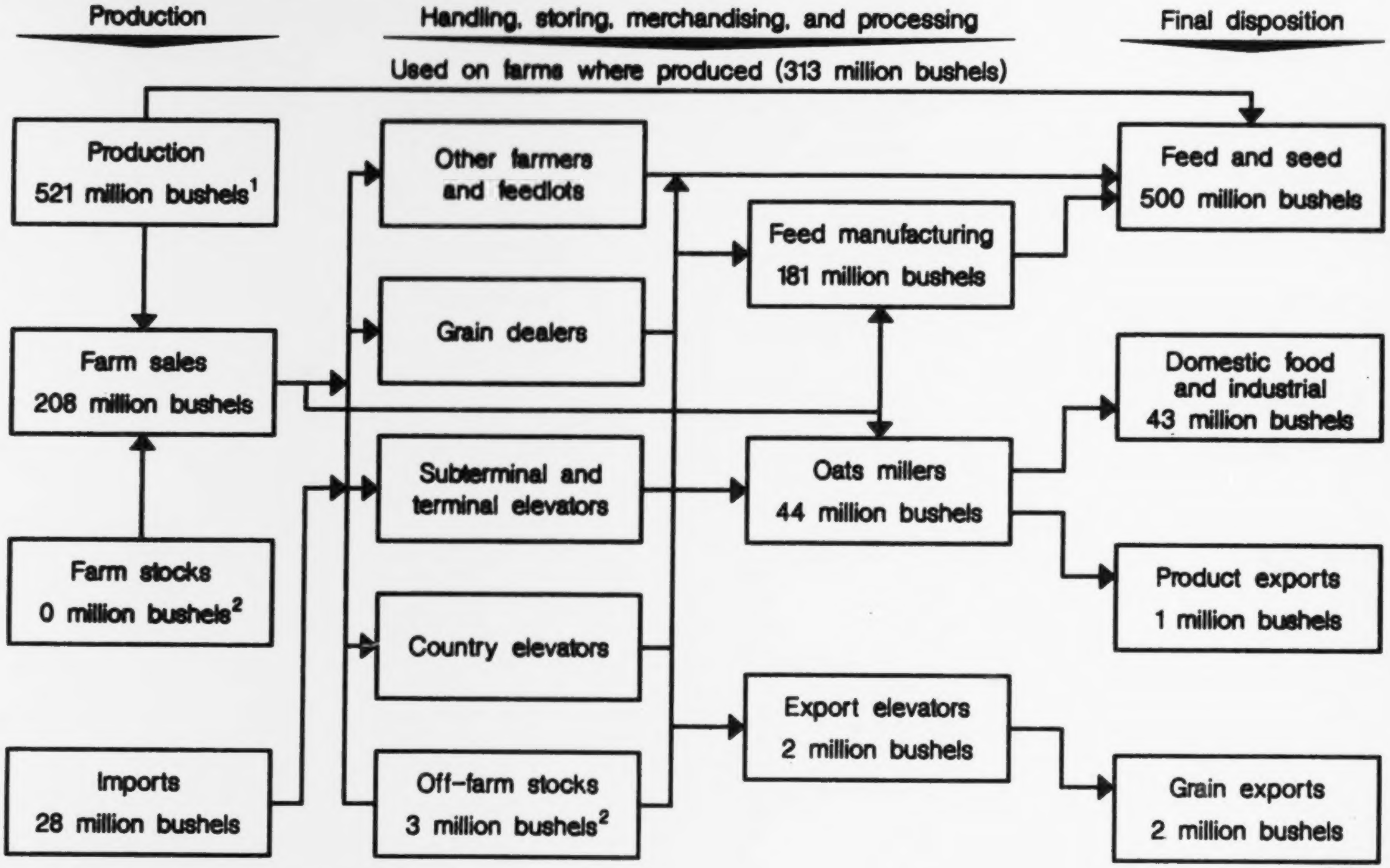
Harvesting oats for grain usually begins in mid-May and lasts until late August or early September depending upon the area of production (table 4). After harvest, oats are sold immediately or stored either on or off the farm. Artificial drying requirements for oats are minimal because they can generally be harvested at 14-percent moisture or less, a moisture level considered safe for storage. Constant monitoring of oats quality, such as adequate aeration and insect control, is recommended while oats are in onfarm storage.

Assembly of oats into economical lots for transportation and processing is one function provided by country and terminal elevators. Country elevators assemble and store oats and other grains or oilseeds. These elevators store grain for farmers or they buy grain from farmers and in turn sell to processors, terminal elevators, or exporters. They generally can ship grain by truck or rail. Terminal elevators, however, can usually ship and receive by truck, rail, and, in many cases, barge.

The storage function is provided mostly by farmers, elevator operators, and some processors or millers. Storage capacity is generally adequate, because oats are usually harvested before the other major commodities such as wheat, corn, or soybeans. This function permits the year-round distribution of a commodity produced once a year. Oats are usually stored close to the point of

Figure 9

The U.S. oats marketing process, 1985-86


Production
Handling, storing, merchandising, and processing
Final disposition
Used on farms where produced (313 million bushels)
Production 521 million bushels[1]
Farm sales 208 million bushels
Farm stocks 0 million bushels[2]
Imports 28 million bushels
Other farmers and feedlots
Grain dealers
Subterminal and terminal elevators
Country elevators
Off-farm stocks 3 million bushels[2]
Feed manufacturing 181 million bushels
Oats millers 44 million bushels
Export elevators 2 million bushels
Feed and seed 500 million bushels
Domestic food and industrial 43 million bushels
Product exports 1 million bushels
Grain exports 2 million bushels

1/ 60 percent of production was used on the farm.
2/ Change between beginning and ending stocks.
Source: (*35,38,60,71*)

Table 15--Farm sales of oats by marketing channels, 1983-84

Region/State	Local elevator	Terminal elevator	Other farmers	Grain dealer	Feed lot	Processor
			Percent			
Corn Belt	39	4	32	25	0	0
Illinois	25	0	27	48	0	0
Indiana	28	0	72	0	0	0
Iowa	76	0	15	9	0	0
Ohio	47	16	20	17	0	0
Lake States	64	0	14	17	0	5
Michigan	84	0	16	0	0	0
Minnesota	72	0	16	0	0	12
Wisconsin	50	0	12	38	0	0
Mountain States	32	5	54	9	0	0
Montana	32	5	54	9	0	0
Northern Plains	58	3	17	17	4	1
Kansas	62	0	20	7	11	0
Nebraska	40	0	26	34	0	0
North Dakota	47	15	16	15	0	7
South Dakota	73	0	11	10	6	0
Northeast	22	0	26	35	0	17
New York	28	0	14	35	0	23
Pennsylvania	15	0	39	35	0	11

Source: (64).

production, thereby maintaining flexibility in alternative destinations. The closer grain is to a destination, the less flexible it is in being diverted to another market.

The quantity of oats stored on the farm has declined since the early fifties because of declining production (table 17). Onfarm stocks as of October 1, 1958, were 1.2 billion bushels but declined to 0.5 billion bushels by October 1, 1985, a drop of nearly 60 percent. The proportion of stocks stored on farm also declined, but at a much smaller rate. The onfarm share was 93 percent in 1950 dropping 18-20 percentage points to 73-75 percent in the early seventies, then rising to 83-84 percent in the early eighties. This shift may be due to declining farm feed use which requires lower farm stocks. Farm stock requirements appear to be decreasing faster than processor stock requirements.

Oats stocks are predominately located in the key producing States. On October 1, 1985, about 60 percent of all stocks were located in Iowa, Minnesota, North

Table 16—Share of oats producer sales by marketing channels, selected States, 1977

State	Local elevators	Terminal elevators	Dealers	Other farmers and ranchers	Other 1/
			Percent		
California	100	0	0	0	0
Idaho	70	0	0	30	0
Illinois	44	0	0	56	0
Indiana	95	0	0	5	0
Iowa	67	16	0	17	0
Michigan	100	0	0	0	0
Minnesota	93	0	0	7	0
Montana	95	0	0	5	0
Nebraska	82	0	0	18	0
New York	57	0	29	14	0
North Carolina	97	0	0	3	0
North Dakota	85	0	0	15	0
Ohio	100	0	0	0	0
Oklahoma	57	0	0	43	0
Oregon	75	0	0	21	4
Pennsylvania	57	0	3	40	0
South Dakota	90	0	0	10	0
Texas	15	0	49	35	1
Wisconsin	55	0	4	39	2
19 States	81	2	4	13	0

1/ Sales through marketing associations or pools, seed companies, or other farmers and ranchers if not shown separately.
Source: (65).

Dakota, South Dakota, and Wisconsin (71). About 70 percent of all farm stocks were located in these States, but only 48 percent of off-farm stocks were stored in the key States.

Handling and Marketing Methods

The quantity of oats marketed from the farm is declining, although the proportion of total production sold from the farm appears to be rising (table 18). The share of total production sold during 1950-54 averaged about 25 percent, peaked at 38 percent in 1970-74, then fell slightly to 35 percent in 1980. The peak in the early seventies was apparently due to rising export sales in conjunction with the declining importance of onfarm use of oats.

Table 17--Onfarm and off-farm stocks of oats as of October 1

Year	Onfarm stocks	Share of total	Off-farm stocks	Share of total	Total stocks
	1,000 bushels	Percent	1,000 bushels	Percent	1,000 bushels
1950	1,103,985	93	77,922	7	1,181,907
1951	1,074,986	93	82,583	7	1,157,569
1952	971,279	91	98,208	9	1,069,487
1953	938,266	92	86,837	8	1,025,103
1954	1,116,083	91	114,255	9	1,230,338
1955	1,188,409	90	138,574	10	1,326,983
1956	924,543	88	127,867	12	1,052,410
1957	1,046,066	91	103,781	9	1,149,847
1958	1,188,375	90	132,492	10	1,320,867
1959	883,217	89	111,781	11	994,998
1960	960,326	89	121,272	11	1,081,598
1961	858,326	88	113,169	12	971,495
1962	853,700	89	109,399	11	963,099
1963	820,559	88	112,871	12	933,430
1964	728,807	86	120,316	14	849,123
1965	782,038	85	138,613	15	920,651
1966	678,804	81	156,250	19	835,054
1967	650,293	83	135,670	17	785,963
1968	791,680	84	154,655	16	946,335
1969	847,091	81	193,728	19	1,040,819
1970	857,909	78	246,292	22	1,104,201
1971	810,818	74	280,502	26	1,091,320
1972	681,046	73	249,036	27	930,082
1973	605,348	75	198,719	25	804,067
1974	497,668	76	155,720	24	653,388
1975	485,856	79	130,775	21	616,631
1976	417,306	79	112,445	21	529,751
1977	564,095	83	115,459	17	679,554
1978	530,881	82	115,008	18	645,889
1979	465,607	82	102,310	18	567,917
1980	395,400	82	89,342	18	484,742
1981	384,681	84	73,745	16	458,426
1982	462,795	83	95,287	17	558,082
1983	426,127	84	79,090	16	505,217
1984	397,368	84	76,540	16	473,908
1985	417,387	81	94,993	19	512,380

Source: (69).

Table 18--Production of oats for grain with farm and off-farm disposition

Period	Production	Used on farms where grown	Sold	
			Quantity	Share of crop
Five-year average:	1,000 bushels			Percent
1950-54	1,285,417	962,846	322,571	25.1
1955-59	1,279,543	935,476	342,267	26.7
1960-64	998,722	698,154	300,568	30.1
1965-69	888,646	568,864	319,782	36.0
1970-74	754,211	467,000	287,211	38.1
1975-79	608,076	370,067	230,118	37.8
1980	458,792	297,633	159,906	35.0
1981 1/	509,529	305,717-331,194	178,335-203,812	35.0-40.0
1982 1/	592,630	355,578-385,210	207,421-237,052	35.0-40.0
1983 1/	476,961	286,177-310,025	166,936-190,784	35.0-40.0
1984 1/	473,661	284,197-307,880	165,936-189,464	35.0-40.0
1985 1/	520,800	312,480-338,520	182,280-208,320	35.0-40.0

1/ Estimates of quantity used on farms discontinued with 1981 crop year. Proportion of crop sold off-farm was estimated to range 35-40 percent.
Source: (51).

The U.S. oats marketing year covers the period of June 1 through May 31.[2] Over 30 percent of farm marketings of oats are concentrated during the harvest months of July and August (table 19). Despite increased onfarm storage capacity, this marketing pattern does not appear to have changed drastically.

Some of the popular marketing strategies available to oats producers are selling for cash at harvest, cash forward contracts, deferred pricing, or futures contracts (42). The sale of oats at harvest is self-explanatory. The farmer receives the going price from the market. A cash forward contract allows the farmer to predetermine the price before delivery. A deferred pricing arrangement will assure an outlet for the oats without fixing price. This marketing strategy could be used if an offer of a firm forward price was not received or if the farmer anticipates a rise in price but has limited storage capacity. A futures contract can be used by a farmer to secure a fixed price through hedging.

The most frequent handling method conducted by oats farmers at harvest in 1983 was delivery to farm storage followed by delivery to off-farm destinations (64). The least used handling method was direct selling from the field. The pricing method used most often was the cash sale regardless of whether the sale was direct from the field, delivered to buyers at harvest, or sold from farm storage (app. tables 4-9).

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[2] The marketing year for oats prior to June 1, 1976, was July 1 through June 30.

Table 19--Monthly farm marketings of oats, selected marketing seasons

Month	1973-74	1980-81	1981-82	1982-83	1983-84
			Percent		
May	0.5	0.5	0.6	0.1	2.0
June	4.5	3.3	3.5	2.3	3.8
July	12.4	22.0	20.6	13.5	13.1
August	18.1	18.7	17.0	24.7	20.8
September	8.1	7.1	7.2	6.6	8.1
October	5.2	4.4	4.6	4.3	6.0
November	5.3	4.4	4.3	3.5	5.2
December	5.7	5.4	4.9	5.6	5.1
January	8.9	7.3	4.7	6.9	7.4
February	7.7	7.0	6.7	5.3	6.4
March	5.1	6.5	6.6	5.7	5.5
April	5.4	4.8	6.6	7.4	5.9
May	6.1	3.8	5.9	6.2	4.8
June	7.0	4.8	6.8	7.9	5.9

Source: (69).

Grades and Inspection

The marketing system for oats, other grains, and oilseeds possesses a set of grades and standards that describe the physical and biological characteristics of the commodity that are important to users and permit exchange without visual inspection. Prices can be differentiated among lots of different quality characteristics, stimulating production of desired qualities.

Grain can be officially or unofficially graded (67). Grading services can be performed by a Federal, State, or private agency. Grain must be graded and inspected according to provisions of the U.S. Grain Standards Act to be classified as an official grade. Equipment and procedures used must be approved and checked regularly for accuracy, and inspectors are tested for proficiency. The Federal Grain Inspection Service (FGIS) administers and supervises the official U.S. inspection system. Domestic oats transactions can be conducted on unofficial grades, although official grades may still be requested. All exports require official grades and weighing at port of export.

Grades

Oats are divided into five grades. Four of these are numerical, U.S. Nos. 1, 2, 3, and 4, and one is "sample grade" (table 20). Special grades are also provided to emphasize special qualities of oats and are added to the grade designation. Oats are not divided into classes or subclasses.

Table 20—Official U.S. oats grades and grade requirements

Grade 1/	Minimum limits		Maximum limits		
	Test weight per bushel	Sound oats	Heat-damaged kernels	Foreign material	Wild oats
	Pounds	Percent			
U.S. No. 1	36	97	0.1	2	2
U.S. No. 2	33	94	.3	3	3
U.S. No. 3 2/	30	90	1.0	4	5
U.S. No. 4 3/	27	80	3.0	5	10

1/ The official grading system also includes a "U.S. Sample Grade" defined as follows: U.S. Sample grade shall be oats which —

(a) Do not meet the requirements for the grades U.S. Nos. 1, 2, 3, or 4; or

(b) Contain 8 or more stones which have an aggregate weight in excess of 0.2 percent of the sample weight, 2 or more pieces of broken glass, 3 or more crotalaria seeds (*Crotalaria* spp.), 2 or more castor beans (*Ricinus communis*), 4 or more pieces of an unknown foreign substance(s) or a commonly recognized harmful or toxic foreign substance(s), 8 or more cockelbur or similar seeds singly or in combination, or 10 or more pieces of rodent pellets, bird droppings, or an equivalent quantity of animal filth in 1-1/8 to 1-1/4 quarts cut from the representative sample; or

(c) Have a musty, sour, or commercially objectionable foreign odor (except smut or garlic odor), or,

(d) Are heating or otherwise of distinctly low quality.

2/ Slightly weathered oats shall be graded no higher than U.S. No. 3.

3/ Oats that are badly stained or materially weathered shall be graded no higher than U.S. No. 4.

Source: (68).

Grain standards are determined based on the following factors:

Test weight per bushel: The weight per Winchester bushel (2,150.42 cubic inches) as determined on a test portion of the original sample by an approved device.

Sound oats: Kernels and pieces of oats kernels (except wild oats) which are not badly ground damaged, badly weather damaged, diseased, frost damaged, heat damaged, insect bored, mold damaged, sprout damaged, or otherwise materially damaged.

Heat-damaged kernels: Kernels and pieces of oat kernels, other grains, and wild oats which are materially discolored and damaged as a result of heating.

Foreign material: All matter other than oats, wild oats, and other grains.

Wild oats: Seeds of *Avena fatua* and *A. sterilis*.

Grade Designation

Once graded, grade designations are written in the following sequence:

(a) U.S. No.;
(b) the words "or better" are shown next if applicable;
(c) next, special grade designations are shown if relevant;
(d) next, the word "oats";
(e) and, special grade designations, if applicable.

The definitions for special grades are as follows:

Bleached oats: Oats which in whole or in part have been treated with sulfurous acid or any other bleaching agent.

Example: U.S. No. 2 Oats, Bleached

Bright oats: Oats, except bleached oats, of good natural color.

Example: U.S. No. 1 Bright Oats

Ergoty oats: Oats containing ergot in excess of 0.1 percent.

Example: U.S. No. 3 Oats, Ergoty

Extra-heavy oats: Oats having a test weight per bushel of 40 pounds or more.

Example: U.S. No. 1 Extra-Heavy Oats

Heavy oats: Oats with a test weight per bushel of 38 pounds or more but less than 40 pounds.

Example: U.S. No. 2 Heavy Oats

Garlicky oats: Oats containing four or more green garlic bulblets or an equivalent quantity of dry or partly dry bulblets in 500 grams of oats.

Example: U.S. No. 2 Oats, Garlicky

Smutty Oats: Oats whose kernels are covered with smut spores or contain smut masses and smut balls in excess of 0.2 percent.

Example: U.S. No. 2 Oats, Smutty

Thin oats: Oats containing more than 20 percent of oats and other matter, except "fine seeds," which may be removed from a test portion of the original sample by approved devices.

Example: U.S. No. 3 Oats, Thin

Weevily oats: Oats infested with live weevils or other insects injurious to stored grain.

Example: U.S. No. 2 Oats, Weevily

Transportation

Oats are bulkier than other grains and are usually processed or fed to livestock near the point of production. The amount of oats that must be transported consequently is relatively small compared with other grains. For example, about 228 million bushels of oats were shipped by grain marketing firms in 1977 in contrast to 370 million bushels of barley, 671 million bushels of sorghum, 2.5 billion bushels of wheat, and 6.7 billion bushels of corn (37).

Trucks were the predominant intrastate mode of transport, followed by rail and farm trucks. Shipments within Minnesota account for nearly half of the U.S. intrastate shipments. A large portion of these shipments represented movements from country to terminal elevators for storage or transshipment (table 21).

Interstate shipments of oats totaled 106.8 million bushels in 1977 (table 22). Railroads were the predominant mode of transport, moving 49 percent of the volume, followed by truck, barge, and farm truck. About a quarter of these shipments originated in Minnesota with principal destinations in Pennsylvania, Tennessee, and Wisconsin (1). North Dakota and South Dakota also generated sizable rail shipments with Minnesota as the major destination.

Approximately 20 million bushels of oats were transported to port areas during 1977. Only about 8.3 million bushels of those shipments were exported. The remainder were processed, transshipped, or stored (table 23). About two-thirds of these shipments originated in Minnesota or North Dakota. Railroads carried nearly half of all oats shipments to ports, followed by trucks, barges, and farm trucks.

Recent issues in the transportation sector affect the shipment of oats. For example, with the abandonment of rail lines and bankruptcy of railroad firms, some areas have lost rail services and have been forced to ship by truck. This change may affect transport costs for the longer haul more than for the shorter haul. Contract rail rates may help some oats shippers with sufficient volume. With such contracts, service can be secured for a known rate. Barge transportation costs should not be affected by user charges, due to the low volume shipped.

Processing

Processing of oats is undertaken by both the oats millers and prepared feed manufacturers. The feed manufacturing industry is an important user of oats. In 1975, feed manufacturers used 1,712,000 tons of oats in the production of feed, about 15-17 percent of annual disappearance of oats (table 24). In 1985, processing of oats for human consumption consumed about 44 million bushels which equaled 8 percent of disappearance, or 20-24 percent of the oats sold off-farm.

Table 21—Intrastate shipments of oats for each State and mode of transportation, 1977

Originating State	Rail	Truck	Barge	Farm truck 1/	Total
			1,000 bushels		
Alabama	789	516	0	28	1,333
Arizona	0	215	0	0	215
Arkansas	0	759	0	20	779
California	0	714	0	0	714
Florida	1,494	315	0	0	1,809
Georgia	180	579	0	269	1,028
Illinois	0	1,973	82	2,295	4,350
Indiana	0	297	0	46	343
Iowa	130	4,138	0	10,984	15,252
Louisiana	0	711	0	0	711
Maine	106	0	0	0	106
Michigan	10	1,806	0	0	1,816
Minnesota	28,910	21,430	0	5,801	56,141
Mississippi	3,100	159	0	0	3,259
Missouri	981	0	0	0	981
Nebraska	5,375	6,003	0	6,764	18,142
New York	30	106	0	54	190
North Carolina	3	1,162	0	0	1,165
Ohio	428	5,532	0	0	5,960
Oklahoma	0	35	0	0	35
Oregon	137	2,769	0	0	2,906
Pennsylvania	0	984	0	0	984
South Carolina	492	10	0	223	725
South Dakota	0	40	0	0	40
Tennessee	6	180	0	0	186
Wisconsin	0	1,363	0	203	1,566
Wyoming	0	0	0	5	5
Total volume	42,171	51,796	82	26,692	120,741
			Percent		
Share of total volume	34.9	42.9	0.1	22.1	100.0

Note: These data include shipments to port cities within the State but not exports to destinations outside the United States.

1/ This column reports sales by elevators to farmers within the State. Not all States included farm sales in their survey questionnaires. Thus, these data are incomplete and underestimate total shipments to farmers.

Source: (36).

Table 22--Interstate shipments of oats for each State and mode of transportation, 1977

Originating State	Rail	Truck	Barge	Farm truck 1/	Total
			1,000 bushels		
Alabama	778	609	0	0	1,387
Arkansas	50	2,591	0	0	2,641
Colorado	0	24	0	0	24
Florida	72	196	0	0	268
Georgia	23	0	0	0	23
Idaho	240	0	0	0	240
Illinois	828	487	624	41	1,980
Indiana	29	179	0	0	208
Iowa	3,277	3,917	968	0	8,162
Kentucky	466	0	150	0	596
Louisiana	20	0	1,229	0	1,249
Maine	194	0	0	0	194
Maryland	0	2	0	0	2
Michigan	4,078	2,004	0	0	6,082
Minnesota	12,964	6,450	2/9,819	26	29,259
Mississippi	183	341	0	0	524
Missouri	853	29	0	0	882
Montana	568	569	0	0	1,137
Nebraska	4,310	3,206	0	1,594	9,110
New York	44	70	0	0	114
North Carolina	384	0	0	0	384
North Dakota	6,209	5,596	0	0	11,805
Ohio	5,970	3,048	0	0	9,018
Oregon	1,058	4,470	0	0	5,528
Pennsylvania	0	51	0	0	51
South Carolina	81	771	0	5	857
South Dakota	8,248	4,430	0	0	12,678
Tennessee	573	108	0	0	681
Texas	0	18	0	0	18
Utah	75	276	0	0	351
Virginia	70	0	0	0	70
Washington	0	152	0	0	152
Wisconsin	493	601	2/ 0	12	1,106
Wyoming	0	0	0	12	12
Total volume	52,118	40,195	12,790	1,690	106,793
			Percent		
Share of total	48.8	37.6	12.0	1.6	100.0

Note: These data include shipments to port cities but not exports to destinations outside the United States. Movements to ports from each State are shown in table 23.

1/ This column reports sales by elevators to farmers located in other States. Not all States included farm sales in their survey questionnaires. Thus, these data are incomplete and underestimate total shipments to farmers.

2/ Barge shipments from Wisconsin are included with shipments from Minnesota to avoid disclosure of individual firms' operations.

Source: (36).

Table 23--Movements of oats to points of export for each originating State by four modes of transportation, 1977

Originating State/port	Export region	Mode of transportation: Rail	Truck	Barge	Farm truck	Total
		1,000 bushels				
Illinois	Great Lakes	3	7	82	0	92
Iowa	Great Lakes	37	0	0	0	37
	Gulf of Mexico	1,134	0	0	0	1,552
Minnesota	Great Lakes	3,008	1,575	0	0	4,583
	Gulf of Mexico	748	43	1/3,008	0	3,879
Montana	Great Lakes	230	1,434	0	0	4,756
North Dakota	Great Lakes	3,322	1,434	0	0	4,756
	Pacific	31	181	0	0	212
Oregon	Pacific	137	2,730	0	0	2,867
South Dakota	Great Lakes	845	420	0	0	1,265
Wisconsin	Great Lakes	179	433	0	144	756
Chicago	Great Lakes	0	14	0	0	14
Duluth-Superior	Great Lakes	107	0	0	0	107
All States	Great Lakes	7,731	4,007	82	144	11,964
	Gulf of Mexico	1,882	43	3,506	0	5,431
	Pacific	168	2,911	0	0	3,079
Total volume		9,781	6,961	3,588	144	20,474
		Percent				
Share of total voulme		47.8	34.0	17.5	0.7	100.0

1/ Barge shipments from Wisconsin firms to gulf ports are included with several from Minnesota to avoid disclosure of individual firms' operations.
Source: (36).

Feed Manufacturing

Feed manufacturing accounted for about 19 percent of total oats feed and residual use in 1975. Oats are about 5 percent of all grains used by primary feed manufacturers and only 2.5 percent of total ingredients used by primary feed manufacturers in both 1969 and 1975 (73, 74). The mix of feed ingredients varies by location and feed manufacturer. Factors that determine use of ingredients include nutritive value, relative price, nutritive specification of the required feed, and manufacturers' or feeders' preferences.

The feed manufacturing industry produces complete feeds, feed supplements, and premixes. Complete feed contains all nutrients needed in the nonroughage portion of a particular livestock's diet. A feed supplement is a formula feed used with other feed ingredients to improve nutrition. Premixes consist of one or more microingredients--such as vitamins, trace minerals, or drugs--mixed with a carrier. A premix is usually added at a rate of less than

Table 24--Feed ingredients used by primary feed manufacturers

Feed ingredient	1969	1975
	1,000 tons	
Grains:		
Corn	19,787	25,979
Sorghum	7,589	5,593
Barley	2,441	2,381
Oats	1,697	1,712
Wheat	819	759
Subtotal	32,333	36,424
Oilseed meals:		
Soybean	10,686	9,841
Cottonseed	1,496	1,112
Other	326	366
Subtotal	12,508	11,319
Grain byproducts:		
Brewer's dried grains	416	429
Distiller's dried grains	450	569
Corn gluten feed	718	461
Corn gluten meal	382	749
Hominy feed	866	697
Wheat mill feed	4,197	3,523
Other mill feeds	759	1,628
Subtotal	7,788	8,056
Animal protein meals	3,287	3,095
Minerals	2,928	2,646
All other ingredients	9,688	7,989
Total	68,532	69,529

Source: (73, 74).

100 pounds per ton of finished feed.

Formula feed production for 1975 totaled 104.5 million tons. Primary manufacturers, who process and mix individual feed ingredients with an optional premix, accounted for 71 percent of the total produced or 74.7 million tons. Secondary manufacturers, who process or mix one or more ingredients with formula feed supplements, accounted for the remaining 29 percent or 29.9 million tons.

During 1975, there were 6,340 formula feed establishments (table 25). The Corn Belt accounted for 30 percent of all feed manufacturing establishments and 18 percent of total production. The Lake States and Northern Plains are the next most important regions in terms of numbers of establishments with 14

Table 25—Location of feed production and feed manufacturing firms

Region	Proportion of total feed tonnage produced	Proportion of total manufacturing firms
	Percent	
Northeast	11	10
Appalachia	7	7
Southeast	9	6
Lake States	10	14
Corn Belt	18	30
Delta States	6	3
Northern Plains	9	14
Southern Plains	12	7
Mountain States	8	5
Pacific	10	4

Source: (74).

percent each; the Southern Plains and Northeast are the next most important in terms of total tonnage produced at 12 percent and 11 percent.

Food Processing

Oats processing plants are concentrated in the North Central States. The edible products of processed oats are rolled oats, steel-cut oatmeal, and ground oatmeal. In contrast to the bran coat of the wheat kernel, the oats hull can be removed with relative ease. Oats hulls are sold to the mixed feed industry or sold to manufacturers of furfural which in turn is used in manufacturing synthetic resins (10).

Flaked or rolled oats and oat flour are manufactured through a dry-milling operation. Additional products and byproducts from the dry-milling process include feed oatmeal, hulls, fines, and whole or broken groats. Oats hulls may be used in chemicals, as an animal feed, or as a fuel for power plants. Oats hulls are a basic raw material in the production of furfural, a chemical intermediate in the production of a number of important industrial products such as nylon, lubrication oils, butadiene, phenolic resin glues, and rubber tread materials.

Milling oats must meet certain quality standards, and millers prefer oats that have a good milling yield. For example, some millers set a minimum protein content of 14 percent for milling purposes. A good oats yield will be 100 pounds of groats from 160 pounds of farm-produced oats. This yield generally requires the following grade requirements: a test weight of 38 pounds per bushel, a sound count of at least 96 percent, and a foreign material content of 3 percent or less. Moisture content must be 13 percent or less. Other grains, such as wheat or barley, should not exceed 1.5 percent (47). Good milling oats should be cool and sweet and free of insect infestation and other contaminants.

Processing requires many steps. After cleaning and preparation, the oats considered suitable for processing are run though a drying house. This process consists of a series of vertical pans. During this process of toasting and drying, oats acquire a flavor. After drying, oats are moved into cooling bins for a period of time.

Oats are next graded into classes of large, slim, and stub. They are hulled through the use of two milling stones, one stationary and one moving. Dust and hulls are removed after the hulling process.

Steel-cut oatmeal is prepared from groats which are cut into granular pieces by steel rolls and then packaged. Rolled oats are produced by passing the groats into a steam chamber and then moved through rollers where they are formed into flakes. These flakes are then cooled by air to a temperature of 100-120 degrees Farenheit and packaged.

Exporting

During 1950-84, exports as a share of disappearance peaked at 7 percent in 1973/74, but in many other years have been less than 1 percent. Shipping oats great distances is usually not economical because of their bulk and low-value characteristics.

Duluth, Minnesota, and Superior, Wisconsin, on the Great Lakes were the predominant ports of export for most years during 1976-85 (table 26). These

Table 26--Oats inspections for export by port areas, 1976-85 1/

Crop year	Great Lakes	Atlantic	Gulf	Pacific	Interior 2/	Total
			1,000 bushels			
1976/77	7,269	0	437	0	0	7,706
1977/78	8,671	0	675	48	0	9,394
1978/79	9,337	4	59	0	0	9,400
1979/80	1,303	2	0	0	12	1,317
1980/81	5,791	0	80	0	452	6,323
1981/82	694	0	0	0	274	968
1982/83	216	0	0	0	39	255
1983/84	325	0	211	0	0	536
1984/85	0	0	38	0	0	38
1985/86	0	0	101	0	109	210

1/ Inspections for exports are a proxy for actual exports.
2/ Inspections of shipments destined for Mexico.
Source: (53).

ports are close to production regions and convenient for shipping to Western Europe, a chief importer of U.S. oats (table 27).

PRICING

Oats prices are determined in both the cash and futures markets through the interaction of buyers and sellers. Producers' prices direct the use of resources for oats production, they determine the amount of farmers' revenue derived from the sale of oats, and they allocate the use of oats among competing users such as feed manufacturers or food processors. Factors that partially explain the cash or futures price include oat supply, prices of competing grains, animal units on feed, livestock and milk prices, and per capita income. Government support prices have been less a factor in supporting farm prices during 1972-85 than during 1950-71. During 1950-85, oats price variation was similar to that of corn. Producer prices of oats, adjusted for inflation, have trended downward annually by 3.3 cents a bushel since 1950.

Pricing System

An organized commodity exchange or board of trade is important in determining oats prices because it provides and regulates a market so that its members have facilities for trading in cash or futures contracts (27). Major cash markets for oats, as reported by the U.S. Department of Agriculture's *Grain and Feed Market News*, are located in Minneapolis, Minnesota, and Toledo, Ohio. Two futures markets are located in Chicago, Illinois (MidAmerica Commodity Exchange and Chicago Board of Trade).

Table 27--Destination of U.S. oats inspected for export

Crop year	Destination							
	Western Europe	South America	Central America	Japan	Canada	Middle East	Philippines	Total
	1,000 bushels							
1976/77	6,634	270	5	797	0	0	0	7,706
1977/78	7,928	242	31	1,193	0	0	0	9,394
1978/79	6,117	342	3	1,180	1,612	146	0	9,400
1979/80	172	117	8	0	1,014	0	6	1,317
1980/81	2,553	1,194	440	551	1,585	0	0	6,323
1981/82	223	471	274	0	0	0	0	968
1982/83	140	76	39	0	0	0	0	255
1983/84	0	536	0	0	0	0	0	536
1984/85	0	38	0	0	0	0	0	38
1985/86	0	101	109	0	0	0	0	210

Source: (53).

Cash Markets

The cash markets in Minneapolis and Toledo report bid prices daily for U.S. No. 2 Heavy oats. Cash prices are established in these major markets based on the most recent supply and demand information.

Several methods are used, in part, to establish cash prices (10). In a cash market where futures are not traded, such as Toledo, the present price of the nearby Chicago futures contracts may be used as a reference for determining the cash price, a practice called "basis pricing." For example, a processor could bid "10 cents off the September futures" to a country or terminal elevator. Thus, the cash price would be 10 cents less than the current September futures price.

Another method of cash pricing, "booking the basis," is applying a mutually agreed upon basis by both buyer and seller to the current futures price. With such a pricing method, both buyer and seller are exposed to a price level risk. This risk can be reduced by either or both parties through hedging in the futures market or by cash forward contracting.

Futures Markets

A futures contract represents an agreement to buy or sell a commodity at a later time. Futures contracts evolved from a cash contract for deferred delivery called a forward contract. This contract may be entered into between a buyer and a seller who are members of an organized exchange.

A futures contract is transacted at the exchange during a given time period subject to a prespecified set of conditions. A margin deposit is required for each contract. Oats futures contracts are written for 5,000 bushels per contract at the Chicago Board of Trade and for 1,000 bushels each at the MidAmerica Commodity Exchange. The specified quality is set at No. 2 Heavy or No. 1 oats with other grades deliverable at a differential. The seller must specify when delivery will be made which will be sometime during the current delivery month. The delivery months for oats are July, September, December, March, and May. Delivery can be made from approved warehouses in the Chicago, Minneapolis, or St. Paul railroad switching districts. The Chicago Board of Trade requires all deliveries from the Minneapolis-St. Paul area to be discounted by 7.5 cents per bushel under contract price.

Prices of futures contracts are determined by public auction. Trades of futures contracts must be competitive and transacted by an open outcry auction on the trading floor of an exchange.

Futures contracts are usually not settled by delivery. The volume of futures contracts settled by delivery is low because futures trading allows the original buyer or seller to close out the original trade with an offsetting sale or purchase.

The volume of oats traded has generally more than doubled since 1977-78 (table 28). Despite this increase in trading volume, the oats trade is still less than 10 percent of the volume traded for corn, soybeans, or wheat. The volume of trading in oats futures contracts is much less than other markets such as corn, wheat, or soybeans. This low volume is due to a smaller volume of oats entering commercial markets compared with other grains or soybeans. Oats lack

Table 28—Volume of trading in futures at the Chicago Board of Trade, by selected commodity

Calendar year	Wheat	Corn	Oats	Soybeans
	Million bushels			
1971	2,793.6	10,414.4	226.2	15,619.4
1972	4,275.3	9,712.6	208.7	20,218.6
1973	7,837.3	20,374.2	973.8	13,711.5
1974	11,890.3	23,395.2	997.4	13,656.5
1975	11,314.2	24,195.2	772.6	19,567.0
1976	14,869.1	23,046.3	634.4	27,370.9
1977	9,104.0	25,109.1	549.9	39,980.7
1978	12,780.7	30,635.5	1,078.9	42,386.4
1979	17,877.0	43,358.6	1,079.6	45,571.7
1980	27,140.8	59,734.9	1,604.7	58,841.0
1981	22,559.7	53,374.9	1,850.5	52,449.7
1982	20,157.9	39,741.3	2,123.0	45,827.6
1983	19,434.6	59,622.9	1,799.1	68,401.6
1984	14,874.4	45,542.6	775.6	56,813.5
1985	10,639.8	31,964.1	495.1	39,960.6

Source: (11, 16, 31).

the speculative activity compared with other grains or soybeans, and only a small volume of oats is hedged in the futures market.

Price Relationships

Oats prices are related between different geographical markets, between different time periods, and among different product forms. Government support prices have affected farm and market prices differently through time. Price variability tends to widen price spreads between farm and market prices. Oats prices, adjusted for inflation, have shown a modest decline over time.

Spatial Price Differences

Prices of oats from various areas in a competitve market differ by no more than transportation and handling costs. These differentials can change due to changes in market supply and demand conditions or changing transportation and handling costs. For example, price differentials during 1970-84 between the Minneapolis and Toledo oats markets ranged from a -23 cents to +14 cents a bushel (table 29). These changes apparently were mostly related to demand and supply, because transfer costs rose during the mid- to late seventies but began to decline in the early to mideighties.

The price differential between the average Minnesota farm price and Minneapolis market price during the 16-year (1970-85) timespan rose from 10

Table 29--Oats, No. 2 Heavy White, average monthly cash prices, Toledo, Minneapolis, and difference

Crop year	Toledo (1)	Minneapolis (2)	Difference (1) - (2)
	Dollars per bushel		
1970	0.81	0.69	0.12
1971	.79	.66	.13
1972	.93	.80	.13
1973	1.39	1.30	.09
1974	1.71	1.68	.03
1975	1.50	1.66	-.16
1976	1.71	1.74	-.03
1977	1.40	1.27	.13
1978	1.37	1.43	-.06
1979	1.60	1.57	.03
1980	2.17	2.04	.13
1981	2.23	2.14	.09
1982	1.55	1.69	-.14
1983	2.01	1.87	.14
1984	1.92	1.81	.11
1985	1.08	1.31	-.23

Source: (53).

cents a bushel in 1970 to a peak of 34 cents a bushel in 1980, and then declined to 11 cents a bushel in 1985 (table 30). If we assume these differentials represent transportation and handling charges, then we know that these transfer costs rose from 15 percent of the average market price in 1970 to 22 percent in 1978. This period was characterized by rising inflation, increased demand for transportation services, and rising commodity prices. However, transportation and handling costs dropped to 8 percent of average market price in 1985 due primarily to increased competition in the transportation sector.

Price Differences Over Time

Oats prices generally rise during a given crop year by an amount necessary to cover carrying costs; otherwise an economic incentive for the storage function would not exist. Carrying charges consist of three items: storage, interest, and insurance. Elevator storage costs for oats are about 33 cents a bushel per year (57). Interest costs for oats are about 10 percent, slightly more than the prime rate. These costs reflect the cost of borrowing against the inventory's value. Fire insurance costs are about 1.4 cents a bushel per year. Although these costs are only approximate, they illustrate that monthly carrying charges for oats are about 4 cents a bushel per month.

Table 30--Price of oats: Minneapolis market price, Minnesota farm price, and difference

Year	Minneapolis market price 1/ (1)	Minnesota farm price (2)	Difference (1) - (2)
		Dollars per bushel	
1970	0.69	0.59	0.10
1971	.66	.56	.10
1972	.80	.70	.10
1973	1.30	1.13	.17
1974	1.68	1.49	.19
1975	1.66	1.47	.19
1976	1.74	1.55	.19
1977	1.27	1.01	.26
1978	1.43	1.12	.31
1979	1.57	1.26	.31
1980	2.04	1.70	.34
1981	2.14	1.82	.32
1982	1.69	1.36	.33
1983	1.87	1.57	.30
1984	1.81	1.60	.21
1985	1.31	1.20	.11

1/ U.S. No. 2 Heavy.
Source: (53).

A normal carrying charge situation is when prices differ by the carrying charge between contract months. However, in an actual market, these differences vary depending upon the supply situation and the cash and futures price.

When a short crop occurs, an inverted price situation occurs. Futures prices decrease over time, suggesting that the crop should be sold at harvest or shortly thereafter rather than after a lengthy, costly storage period.

Seasonal price variations for cash prices are shown in table 31. The 1980 crop year represents a good year for returns to oats storage because prices rose an average of 4.6 cents a month. The 1982 crop year however, reflects a year when prices declined by an average of 3.4 cents a month. These extreme cases were due, in part, to the short oats crop in 1980 (reduced by drought) and excess supply of oats and all feed grains in 1982.

Product Form Price Differences

Food processors compete with feed manufacturers to secure a supply of oats or processing. The price each user offers is proportional to the price consumers

Table 31--Average monthly and seasonal market prices for oats 1/

Crop year	June	July	August	September	October	November	December	January	February	March	April	May	Average
						Dollars per bushel							
1970	0.65	0.62	0.65	0.70	0.69	0.72	0.71	0.72	0.72	0.67	0.67	0.71	0.69
1971	.70	.63	.61	.64	.64	.66	.68	.69	.69	.66	.67	.70	.66
1972	.70	.69	.70	.71	.76	.81	.91	.88	.84	.84	.86	.91	.80
1973	.93	.93	1.28	1.32	1.26	1.25	1.32	1.55	1.66	1.52	1.26	1.35	1.30
1974	1.43	1.63	1.68	1.71	1.87	1.80	1.74	1.64	1.64	1.49	1.72	1.78	1.68
1975	1.59	1.59	1.70	1.68	1.64	1.69	1.65	1.67	1.66	1.64	1.67	1.72	1.66
1976	1.93	1.84	1.67	1.67	1.66	1.62	1.67	1.78	1.80	1.76	1.81	1.68	1.74
1977	1.38	1.15	1.02	1.11	1.17	1.34	1.32	1.32	1.32	1.33	1.40	1.43	1.27
1978	1.36	1.24	1.28	1.36	1.39	1.47	1.40	1.47	1.54	1.60	1.48	1.55	1.43
1979	1.68	1.60	1.47	1.55	1.65	1.67	1.59	1.52	1.50	1.48	1.52	1.62	1.57
1980	1.67	1.80	1.70	1.86	1.96	2.15	2.16	2.20	2.25	2.23	2.21	2.23	2.04
1981	2.18	2.02	1.99	2.02	2.09	2.28	2.10	2.23	2.26	2.16	2.21	2.16	2.14
1982	2.12	1.87	1.53	1.51	1.51	1.67	1.67	1.67	1.63	1.63	1.73	1.71	1.69
1983	1.67	1.60	1.79	1.94	2.00	1.97	1.94	1.98	1.82	1.87	1.89	1.96	1.87
1984	1.92	1.84	1.77	1.79	1.84	1.92	1.87	1.81	1.82	1.79	1.83	1.65	1.81
1985	1.59	1.44	1.23	1.24	1.19	1.32	1.39	1.37	1.30	1.27	1.16	1.22	1.31

1/ U.S. No. 2 Heavy White, Minneapolis
Source: (53).

pay for the finished product. Past studies have found feed use to be more responsive to price than food use (24).

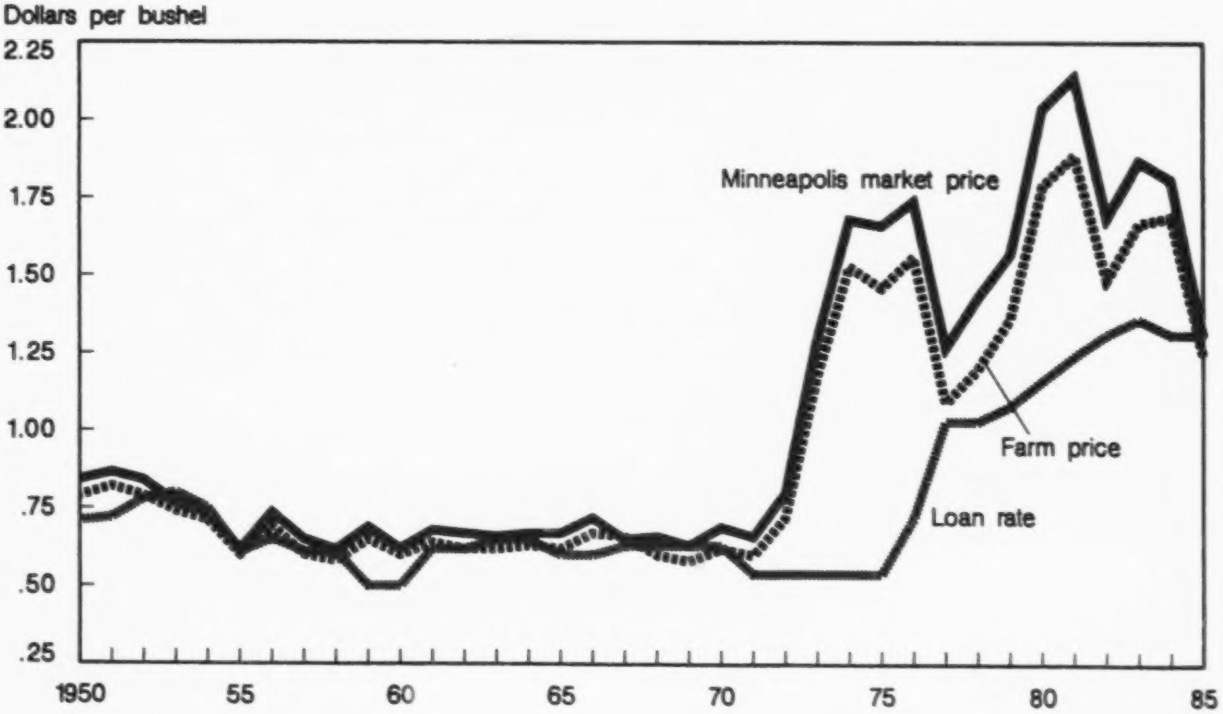
Market Prices and Government Price Supports

Annual average monthly prices for oats at Minneapolis (No. 2, Heavy White) and at the farm along with the oats loan rate are shown in figure 10. Loan rates were quite supportive of farm and terminal market prices during 1950-71. The farm price-loan rate difference averaged only 1.8 cents a bushel. Farm and terminal prices were fairly stable between 1950-71 with an average differential of 4.1 cents a bushel.

Differences between market and farm prices increased during 1972-84 because of increased market price instability. The average difference rose to 18 cents a bushel. Periods of increasing prices appear to involve greater uncertainty which, in turn, tends to widen the average price spread. Loan rates were less a factor in supporting prices although in 1977 they reached $1.03 per bushel, the first time they were above $1.00. The average differential between farm prices and loan rates during this period was 48 cents a bushel. In the past several years, prices have been above the loan rate because of a better balance between supply and demand compared with wheat whose farm prices have been at or below the loan rate.

Figure 10

Prices of oats: Market, farm, and loan rate



Market Price Variability

Average prices received by oats farmers during 1950-84 exhibited a degree of variation similar to corn (table 32). Oats prices were least variable in 1960-64 with a coefficient of variation (COV) of 2.13 cents a bushel. The greatest variability was in 1970-74 (COV = 39.41 cents a bushel), when export demand caused prices to surge. Oats price variability was somewhat greater than corn during 1975-79 apparently due to the larger than normal oats harvest in 1977 causing farm prices of oats to drop 47 cents a bushel from the previous year. During 1970-74, wheat prices were the most variable with a COV of 32.67 cents a bushel. Thus, price variability for oats farmers does not appear substantially out of line with corn, wheat, or soybeans between 1950-84. Compared with oats, price variability for soybeans was about 6 cents a bushel greater while that for wheat was about 6 cents a bushel less.

Real Price Trends

Average oats prices received by farmers, 1950-85, when adjusted for inflation (1982=100), have declined 3.3 cents a bushel annually (fig. 11). This compares with dropping real price trends of 7.5 cents per bushel for corn and 12.7 cents per bushel for wheat. Soybean prices have declined by 5.1 cents per bushel annually, but this trend was statistically insignificant. Technology has improved yields in oats, corn, and wheat faster than their demand growth, creating a declining trend in real prices. This trend was temporarily broken by the surge in export demand during the early- to midseventies.

Factors Affecting the Price Of Oats

Oats prices at the farm level are affected by the price of competing grains, animal units on feed, index of livestock prices, and per capita income.

Table 32--Variability of prices received by farmers for oats, corn, soybeans, and wheat

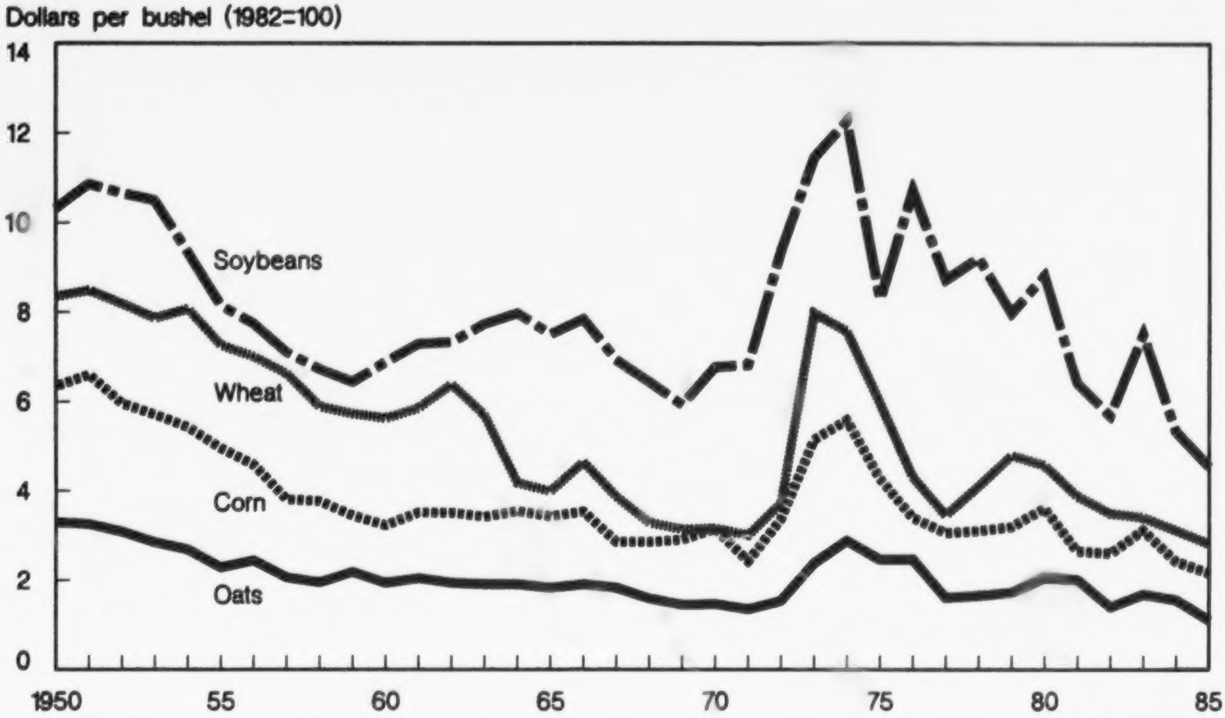
Timespan	Coefficient of variation 1/			
	Oats	Corn	Soybeans	Wheat
	Dollars per bushel			
1950-54	0.0513	0.0503	0.0483	0.0219
1955-59	.0646	.0973	.0481	.0542
1960-64	.0213	.0505	.0725	.1250
1965-69	.0550	.0639	.0537	.1029
1970-74	.3941	.3906	.3267	.5038
1975-79	.1277	.0891	.1108	.1727
1980-84	.0779	.0999	.1375	.0487
1950-84	.4497	.4066	.5060	.3878

1/ Standard deviation divided by the mean.
Source: (35).

68

Figure 11

Real farm prices: Oats, corn, wheat, and soybeans



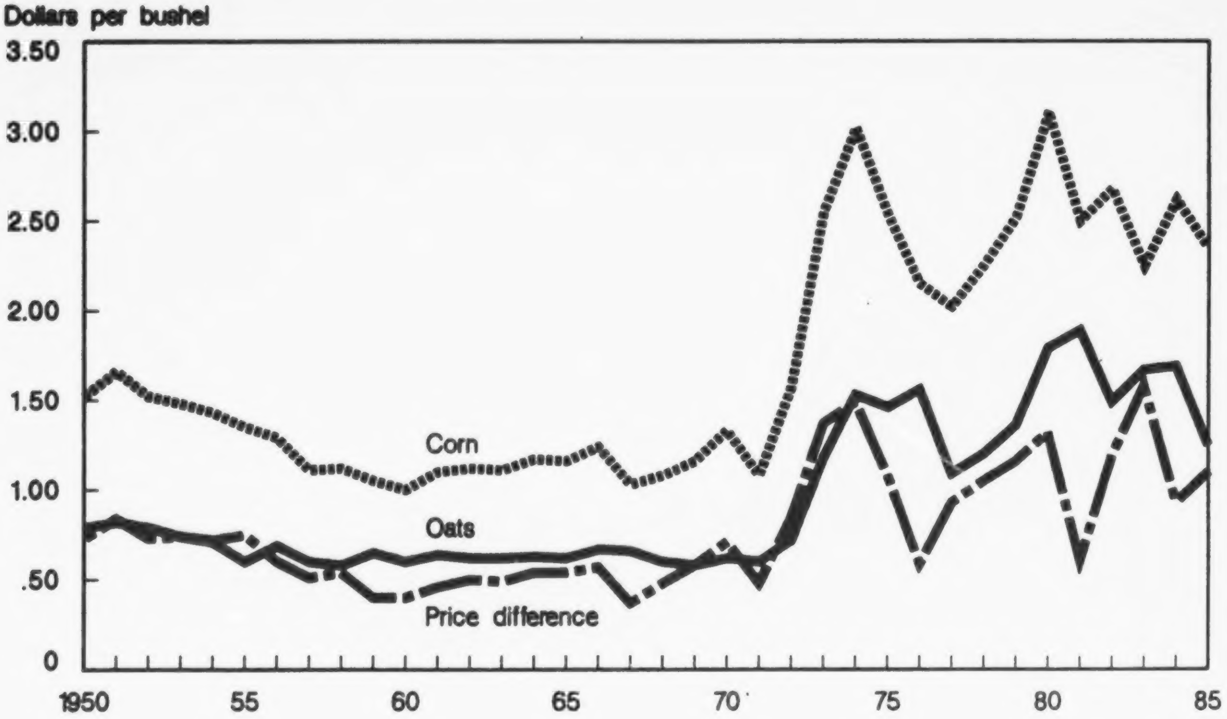
Because about 85 percent of oats are used as feed, the price of oats is highly correlated to the price of corn (correlation coefficient = 0.839), the major feed grain (fig. 12). Results from a study of weekly prices, 1974-80, suggest that for a 1-cent per bushel change in the price of corn, oats prices will change by 0.1314 cent per bushel, and this change will take 3 weeks before the full effect occurs (23).

The feeding value of oats as a substitute for corn varies with the type of livestock fed and the form in which it is fed. Its relative feeding values when fed to different kinds of livestock, pound for pound, are as follows: dairy cows, 95 percent; fattening cattle, 85 percent; hogs, 85 percent; lambs, 90 percent; horses and mules, 90 percent; and poultry, 75 percent (12, 40, 41). The U.S. average is 90 percent. Thus, based on a corn feed value equivalent, oats are, on average, equal to 51.4 percent of corn (32 pounds per bushel x 90 percent / 56 pounds per bushel), bushel for bushel.

During 1910-51, the average November to May price ratio of oats to corn was 59.7 percent (41). These months were used because they are after the corn harvest (prices are normally lower during the harvest period) but before the oats harvest. The variation in this ratio ranged from 45 percent to 72 percent. These extremes were affected by the opposite extremes of the oats/corn supply ratio which averaged 47.3 percent. Neither the price ratio nor the supply ratio exhibited a trend during this period.

Figure 12

Oats and corn price relationship



During 1950-85, this price ratio averaged 58.1 percent and was statistically trendless (fig. 13). This ratio ranged from a low of 46.8 percent in 1970, due to a rising oats supply and a declining corn supply, to a high of 79.8 percent in 1981 when a surge in corn supply led to declining corn prices. During 1910-51, the oats/corn supply ratio was trendless, but it declined 1.2 percent a year during 1950-85. Despite this fact, the oats/corn supply ratio remained a significant variable in the explanation of the price ratio similar to the findings in an earlier study of oats, barley, and sorghum (41).

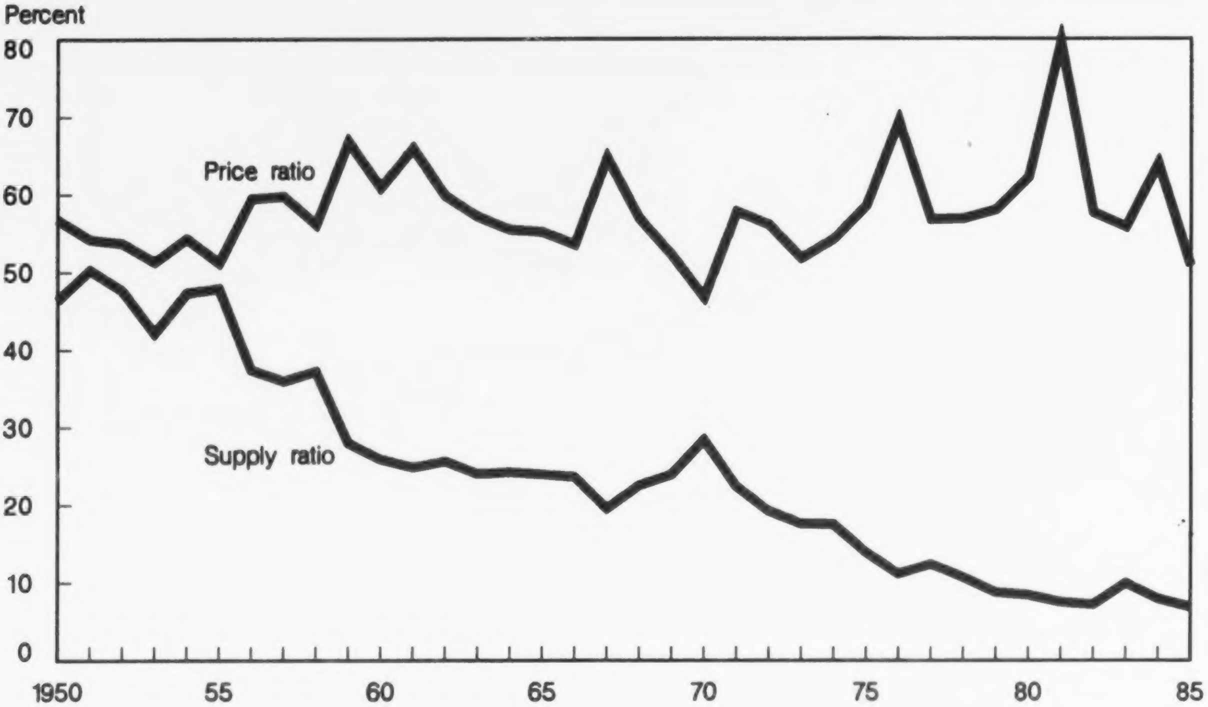
As the volume of oats sold from the farm declined, the relative share of feed use also declined. In contrast, the relative share processed for food has increased. The racehorse industry has been known to seek white plump oats for feed and is reportedly willing to pay a premium for this quality. The food processing industry also has a high quality standard for oats. Thus, an emerging demand for oats by the racehorse industry coupled with a rising relative share of food processing oats could increase the traditional oats-to-corn price ratio, because of rising oats prices in relation to corn. Despite this pressure, annual price relationships reveal no significant changes to date.

COSTS

Cost components for oats production and marketing consist of production, storage, handling, transportation, and processing. Many factors affect the

Figure 13

Oats-to-corn supply and price ratios



level of these costs, some of which are the general level of inflation, firm size, degree of competition, and geographical location. Cash production costs for oats more than doubled during 1975-84. However, these costs are the lowest for most major field crops, making oats an excellent candidate for a conservation crop. In general, aggregate costs for storage, handling, and transportation have moderated or declined since the late seventies due, in part, to declining inflation, declining demand for those services, and deregulation of rail transportation rates.

Processing oats for animal feed or human consumption is an important component to the final value of oats. Industry costs for these processes, however, are unavailable.

Production Costs and Returns for Oats

Receipts and costs for oats production are available from USDA's Economic Indicators of the Farm Sector series (39, 58, 59). The receipt figures include sales from grain and straw, but they do not include Government payments to producers or credits for use as a pasture, silage, companion, or conservation crop.[3] Receipts less cash expenses (before and after capital replacement) represent a shortrun cash-flow position. Because Government payments are not included, these receipts would be less than those shown on an income statement. The return to owned inputs (land, labor, capital, and management) describes the longrun situation of an enterprise and should be used when comparing different commodities.

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[3] Although value of oat grain production fell from 3d to 16th in national ranking of crop values during 1950-85, the true value of oats is often underestimated.

Total U.S. cash costs (excluding replacement costs) of producing oats more than doubled during 1975-84 before dropping slightly in 1985 (table 33). Total cash expenses per planted acre were $38.86 in 1975 and rose to $77.86 in 1981. However, in recent years (1982-85) some of the cost items such as interest and farm overhead declined somewhat, but other items offset this decline and total costs peaked at $78.75 in 1984. After adjusting for inflation, real cash expenses were 26 percent greater in 1981 than 1975 but only 3 percent greater in 1985 than 1975 (table 34).

Each component's share of total cash costs remained fairly constant over time except for four items (table 33). Fuel and lubrication expenses rose from 8 percent of total costs in 1975 to 16 percent in 1982. All costs have been heavily influenced by inflation, but fuel and lubricants were especially affected by the 1979 Arab oil embargo. Taxes and insurance rose from 10 percent of cash expenses in 1975 to 18 percent in 1985. Rising land values, rising insurance rates, and additional crop insurance have apparently contributed to this increase. Interest costs dropped from 25 percent in 1975 to 23 percent in 1981 and to 19 percent in 1983-85. Fertilizer expenses dropped from 19 percent in 1975 to 13 percent in 1983 and 1985. Fairly constant use and prices may be part of the reason for a decline in fertilizer's share. The top four cash expense items in 1975 were interest, 25 percent; fertilizer, 14 percent; repairs, 12 percent; and taxes and insurance, 10 percent. The leaders in 1985 were interest, 19 percent; taxes and insurance, 18 percent; fertilizer, 13 percent; and seed, 11 percent.

Cash production expenses for oats are the least expensive for most major field crops. Thus, their low cost and ease of planting make them an excellent candidate for a conservation crop.

The per acre cash-flow situation (receipts less cash expenses before and after capital replacement) for oats remained positive for nearly all years examined (app. table 10). Returns to management and risk, however, were negative during 1979-85, meaning that insufficient returns existed to pay the owned inputs. For many of these years, returns to oats acreage were particularly affected by reduced earnings for oats straw, a major byproduct often equal to a third or more of total receipts and by cost increases.

Total cash expenses per planted acre differed by region (app. tables 11-13). Cash and replacement expenses were greatest in the Northeast, followed by the Lake States and Corn Belt, and lowest in the Northern Plains. However, the regions that did the best in terms of cash flow (receipts less cash expenses and replacement) were the Lake States and Corn Belt.

Table 33--U.S. cash production costs for oats

Items	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
	Dollars per planted acre										
Variable expenses:											
Seed	3.28	3.18	2.79	4.60	4.90	5.63	7.13	7.15	5.71	8.82	8.46
Fertilizer	7.42	5.57	5.20	6.83	7.55	9.26	9.26	11.17	9.91	10.81	9.96
Lime and gypsum	.59	.61	.63	.78	.93	1.08	1.10	1.35	1.31	1.38	1.36
Chemicals	.31	.29	.26	.78	.80	.87	.95	1.25	1.34	1.32	1.11
Custom operations	1.97	1.96	2.84	2.82	3.05	3.49	3.75	4.21	4.04	4.10	3.95
Fuel, lubrication, and electricity	3.29	3.22	4.63	4.54	7.20	10.34	11.70	11.89	10.53	8.80	7.67
Repairs	4.76	4.30	5.76	5.57	6.01	6.79	7.71	7.59	7.86	7.95	7.24
Hired labor	NA	NA	NA	NA	NA	NA	NA	NA	1.16	1.22	1.20
Miscellaneous	.69	.67	.67	.70	.77	1.24	1.22	.94	.96	.98	.97
Technical services	NA	NA	NA	NA	NA	NA	NA	.06	.06	.06	.06
Total variable expenses	22.31	19.79	22.78	26.62	31.21	38.70	42.82	45.61	42.88	45.44	41.99
Fixed expenses:											
General farm overhead	2.86	3.30	3.42	4.65	6.04	5.73	6.57	4.67	5.18	5.32	5.28
Taxes and insurance	3.94	4.24	4.79	5.29	5.84	10.57	10.65	12.21	12.35	13.33	13.73
Interest	9.74	9.51	9.37	9.70	10.40	11.20	17.82	13.17	14.07	14.66	14.44
Total fixed expenses	16.55	17.05	17.58	19.64	22.28	27.50	35.04	30.05	31.60	33.31	33.45
Total cash expenses	38.86	36.83	40.36	46.26	53.49	66.20	77.86	75.66	74.48	78.75	75.43

NA = Not available.
Source: (39, 58, 59).

Table 34--U.S. cash production costs for oats, adjusted for inflation 1/

Items	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
	Dollars per planted acre										
Variable expenses:											
Seed	5.53	5.04	4.15	6.37	6.23	6.57	7.59	7.15	5.50	8.16	7.57
Fertilizer	12.51	8.83	7.73	9.46	9.61	10.81	9.85	11.17	9.55	10.00	8.92
Lime and gypsum	.99	.97	.94	1.08	1.18	1.26	1.17	1.35	1.26	1.28	1.22
Chemicals	.52	.46	.39	1.08	1.02	1.02	1.01	1.25	1.29	1.22	.99
Custom operations	3.32	3.09	4.22	3.91	3.88	4.07	3.99	4.21	3.89	3.79	3.54
Fuel, lubrication, and electricity	5.55	5.10	6.87	6.29	9.16	12.07	12.45	11.89	10.14	8.14	6.87
Repairs	8.03	6.81	8.56	7.71	7.65	7.92	8.20	7.59	7.57	7.35	6.48
Hired labor	NA	NA	NA	NA	NA	NA	NA	NA	1.12	1.12	1.07
Miscellaneous	1.16	1.06	1.00	.97	.98	1.44	1.29	.94	.92	.91	.87
Technical service	NA	NA	NA	NA	NA	NA	NA	.06	.06	.06	.05
Total variable expenses 2/	37.62	31.36	33.84	36.87	39.71	45.16	45.55	45.61	41.31	42.04	37.59
Fixed expenses:											
General farm overhead	4.82	5.23	5.08	6.44	7.68	6.69	6.99	4.67	4.99	4.92	4.73
Taxes and insurance	6.64	6.72	7.12	7.33	7.43	12.33	11.33	12.21	11.90	12.33	12.29
Interest	16.42	15.07	13.92	13.43	13.23	13.07	18.96	13.17	13.55	13.56	12.93
Total fixed expenses 2/	27.90	27.02	26.12	27.20	28.35	32.09	37.28	30.05	30.44	30.81	29.95
Total cash expenses 2/	65.53	58.37	59.97	64.07	68.05	77.25	82.83	75.66	71.75	72.85	67.53

NA = Not available.
1/ Adjusted by implicit price deflator, 1982=100.
2/ Totals may not add due to rounding.
Source: (39, 58, 59).

Residual returns to management and risk (a longrun measure) were greatest in the Lake States and Corn Belt in 1975 at $37.61 per planted acre. 4/ However, all regions experienced a negative return to management and risk in 1985. The Northern Plains fared best at a negative $36.19 per planted acre while the Northeast fared worst with a negative $65.21.

Comparison of Oats Returns Among Major Crops

Production of oats at the national level usually placed third behind soybeans and corn during 1975-85, occasionally dropping even lower, based on a shortrun cash-flow analysis (table 35). This situation explains why the importance of oats has diminished in the Corn Belt and why acreage in corn and soybeans expanded. Also, oats compete more with wheat or barley. A similar pattern is found by examining the figures for residual returns to management and risk reflecting the longrun situation of an enterprise (table 36).

Farm Storage Costs

About 84 percent of all oats were stored on the farm in 1985 (table 2). Because most of the oats crop can be harvested at 13-14 percent moisture, very little drying is necessary. Adequate aeration and insect control are all that is usually needed for quality control.

The intent of this report is to examine representative costs of farm and off-farm storage facilities and not to evaluate the returns of building farm storage facilities instead of using off-farm facilities. The decision to build onfarm grain handling and storage systems is long term in nature, and a farmer should evaluate the costs and returns of this method instead of using commercial handling and storage services. Since 1949, the Government has aided the farmer in purchasing storage and handling facilities through a CCC recourse loan program.

Farm storage costs for oats have been estimated for different bin sizes. We based these cost estimates on previous research results and updated them to 1984 (18, 28, 48). Costs of storing oats during 1984 ranged from $0.201 to $0.301 per bushel, depending on bin size (table 37).

Commercial Storage and Handling Costs

Costs of handling and storing grain by commercial elevators were computed by the Economic Research Service (ERS), U. S. Department of Agriculture (USDA) in the early seventies. However, ERS no longer calculates these costs. Costs for storing and handling grain in commercial warehouses by farmers vary based on supply and demand conditions. As a proxy for off-farm storage and handling costs, rates offered by commercial warehouses to store CCC-owned grain can be used. CCC uses commercial storage facilities to store inventories acquired through the price support operation and purchase programs. Grains and related

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4/ "In the long run, the return to risk is expected to average near zero, although in any particular year the residual return to risk could be positive or negative depending on weather and supply and demand factors. The return to management should be positive, but the level remains unknown and is speculative. Therefore, the residual returns to both management and risk are expected to average above zero over time" (59).

Table 35--Receipts less cash expenses for selected crops, by crop year 1/

Crop	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
	Dollars per planted acre										
Oats	51.97	54.51	54.76	43.91	34.21	35.32	43.51	28.11	20.12	25.99	-4.46
Corn	89.30	62.41	52.13	92.99	125.32	97.63	56.67	36.45	52.86	65.59	55.05
Sorghum	47.15	36.52	37.32	86.46	67.83	45.05	35.79	17.28	29.38	22.86	21.57
Barley	45.83	43.48	22.62	27.24	36.50	32.85	24.23	22.39	21.36	20.56	-5.24
Wheat	53.20	27.87	19.91	40.84	64.56	43.61	32.08	29.35	40.98	26.61	11.14
Soybeans	73.01	108.96	108.12	119.66	116.90	102.91	73.53	55.21	15.93	-11.55	-6.99

1/ Does not include replacement costs.
Source: (39, 58, 59).

Table 36--Residual returns to management and risk for selected crops, by crop year

Crop	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
	Dollars per planted acre										
Oats	28.28	29.73	26.65	4.25	-10.75	-8.64	-2.03	-31.99	-35.64	-32.34	-49.93
Corn	33.69	6.99	-5.73	22.63	34.26	12.43	-24.09	-33.95	-12.53	-21.36	-22.43
Sorghum	7.50	-5.01	-7.66	38.75	5.00	-18.41	-26.54	-37.96	-30.86	-36.02	37.99
Barley	16.23	11.35	-7.66	-17.78	-16.79	-22.46	-26.59	-35.30	-30.97	-30.12	-44.50
Wheat	18.72	-2.67	-10.55	-12.49	9.03	-8.81	-17.50	-21.13	-12.11	-20.34	-28.73
Soybeans	20.02	42.98	35.80	39.27	32.28	16.55	-3.19	-15.54	15.93	-11.55	-6.99

Source: (39, 58, 59).

Table 37--Farm storage costs for oats 1/

Year	Bin size		
	5,440 bushels	11,070 bushels	15,700 bushels
		Dollars per bushel	
1975	0.1538 - 0.1738	0.1198 - 0.1388	0.1126 - 0.1326
1984	.2812 - .3012	.2207 - .2407	.2007 - .2207

1/ Computed from (48) and updated to 1984 based on producer price index.

commodities in inventory and under loan are stored in about 7,000 commercial warehouses.

The weighted average warehouse storage rate for oats was $0.32 a bushel for the 1985-86 crop year (table 38) (57). Warehouse rates to CCC ranged from $0.317 a bushel per year for Iowa to $0.362 per year for North Dakota. U.S. weighted average handling rates for receiving oats were $0.023 and $0.028 per bushel for barge and rail hopper car (table 39). The weighted average handling rates for transferring oats to barges and rail hopper cars were $0.023 and $0.029 per bushel.

Transportation Costs

Transportation service requirements, the transport capacity necessary to haul off-farm sales of oats, although minor when compared with corn, wheat, or soybeans, impose a cost on producers and consumers of oats (table 40). These transportation services are provided by the truck, rail, and barge industries. Transportation rates increased rapidly in the seventies due in part to increased demand for transportation services and rising inflation. Rail freight rates increased by 255 percent during 1969-82 (51, 1984, p. 450). The implicit GNP price deflator, a measure of the general price level, rose 139 percent during the period.

Grain rates for truck transportation are unregulated at the Federal level.[5] Trucking firms set their rates based on competition, demand, supply, and cost of service. These rates are usually quoted on a volume or weight measure per mile.

Rates for barge transportation are also unregulated and thus set by competitive forces. Since the summer of 1978, the Merchants Exchange of St. Louis has established a barge call session for spot barge rates. These rates have been quite variable. The rates from Minneapolis-St. Paul, Minnesota, to New Orleans, Louisiana, a typical origin and destination for oats that are shipped by barge, have ranged from a low of $7.89 per net ton in the summer of 1983 to $21.16 per net ton in the fall of 1980 (table 41). Contract barge rates have also been used extensively by the industry, but in recent years demand for barge services has been down.

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[5] Some States regulate intrastate rates.

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Table 38--Annual warehouse rates charged for storing CCC-owned oats, selected contract years 1/

State	1975-76 2/	1980-81 3/	1985-86 2/
	Dollars per bushel		
Iowa	0.146	0.271	0.297
Minnesota	.146	.324	.349
Montana	.146	.319	.359
North Dakota	.146	.243	.362
South Dakota	.146	.257	.355
Wisconsin	.146	.357	.338
U.S. average	.146	.284	.317

1/ A contract year = July 1 through June 30. This period reflects the contract length between the warehouse operator and U.S. Government to store and handle CCC-owned grain.

2/ Offer rate system was in effect. A warehouse operator offers storage and handling rates for CCC-owned grain to the U.S. Government based on local supply and demand conditions for those services. The Government was required to accept these rates.

3/ Modified offer rate system was in effect. This system was similar to the offer rate system, except the U.S. Government could negotiate with the warehouse operator to arrive at a rate for storing and handling CCC-owned grain.

Source: (57).

The Interstate Commerce Commission (ICC) regulates rail freight rates for oats. However, rate regulation was reduced in 1980, allowing railroads to contract with shippers for a specified service at a given rate and for an established time period. During 1976, a representative rail rate for oats from Superior, Wisconsin, to Minneapolis/St. Paul (single car rate) was equal to $0.415 per hundredweight or 25 percent of Minneapolis price (table 42). As of January 1984, this percentage was 46 percent, suggesting an increase in transportation's share of the price.

Several issues in the transportation field could increase costs to shippers of grain. The Federal Government could raise the highway use tax in an effort to bolster funds for highway repairs. Such an action would generally raise the rates charged by truckers. Individual States could also raise their tax rates.

Waterway users' charges are set at $0.10 per gallon of diesel fuel. Pending legislation would raise this charge to recoup more of the Federal Government's expense of maintaining the inland waterway system.

Some railroads have gone bankrupt, and branch lines have been abandoned. These actions have reduced rail service, forcing shippers to use alternative

Table 39--Annual rates charged for handling CCC-owned oats, selected contract years[1]

Crop year/ State	Receiving				Load-out			
	Truck	Box car	Hopper car	Barge	Truck	Box car	Hopper car	Barge
	Dollars per bushel							
1975-76: [2]								
Iowa	0.050	0.025	NA	0.025	0.03	0.03	NA	0.03
Minnesota	.050	.025	NA	.025	.03	.03	NA	.03
Montana	.050	.025	NA	.025	.03	.03	NA	.03
North Dakota	.050	.025	NA	.025	.03	.03	NA	.03
South Dakota	.050	.025	NA	.025	.03	.03	NA	.03
Wisconsin	.050	.025	NA	.025	.03	.03	NA	.03
United States	.050	.025	NA	.025	.03	.03	NA	.03
1980-81: [3]								
Iowa	.053	.055	NA	.051	.057	.058	NA	.059
Minnesota	.057	.053	NA	.051	.055	.051	NA	.045
Montana	.064	.067	NA	NA	.049	.049	NA	NA
North Dakota	.070	.068	NA	NA	.052	.051	NA	NA
South Dakota	.061	.060	NA	NA	.041	.041	NA	NA
Wisconsin	.049	.048	NA	.053	.044	.043	NA	.041
United States	.070	.058	NA	.049	.060	.057	NA	.049
1985-86: [2]								
Iowa	.072	.085	.073	.072	.081	.095	.082	.085
Minnesota	.068	.075	.060	NA	.072	.072	.066	.053
Montana	.068	.071	.069	NA	.057	.051	.055	NA
North Dakota	.071	.070	.071	NA	.054	.051	.053	NA
South Dakota	.072	.077	.074	NA	.053	.053	.053	NA
Wisconsin	.056	.061	.056	.060	.058	.118	.051	.080
United States	.083	.092	.076	.063	.082	.093	.079	.063

NA = Not available.

[1] A contract year = July 1 through June 30. This period reflects the contract length between the warehouse operator and U.S. Government to store and handle CCC-owned grain.

[2] Offer rate system was in effect. A warehouse operator offers storage and handling rates for CCC-owned grain to the U.S. Government based on local supply and demand conditions for those services. The Government was required to accept these rates.

[3] Modified offer rate system was in effect. This system was similar to the offer rate, except the U.S. Government could negotiate with the warehouse operator to arrive at a rate for storing and handling CCC-owned grain.

Source: (57).

Table 40--Transportation requirements as measured by volume of grain and soybeans sold from the farm, 1979

Commodity	Volume sold from farm
	1,000 bushels
Corn	2,976,268
Wheat	2,046,496
Soybeans	1,843,097
Sorghum	494,794
Barley	334,438
Oats	216,042

Source: (51).

modes of transportation such as trucks. More recently, mergers and contract rates have been a concern in the field of grain transportation. Mergers could lead to loss of rail service for some shippers. Contract rates could favor large shippers, adding financial pressure on small shippers.

POLICY AND PROGRAMS

The U.S. agricultural sector has received price and income support from Government programs primarily since the Agricultural Adjustment Act of 1933 (6, 43, 52). 6/ That act was passed in response to the farm sector's economic problems of the Great Depression. Price and income supports for oats have evolved over time. Producers of oats benefit from participating in Government programs because their price risk is reduced and income subsidies are received. Government programs for oats have affected land values, trade, and resource use.

Government Programs for Oats

Oats were not designated as a basic commodity in the Agricultural Adjustment Act of 1933 and therefore did not receive direct support during the thirties. Indirect price support, however, was received through price supports for corn, the major feed grain. Oats prices first became eligible for direct supports in 1945 (55). The Secretary of Agriculture had the discretionary authority to support prices through loans during 1945-53 and through purchase agreements during 1947-53. Price supports for oats became mandatory with the Agricultural Act of 1956.

6/ Prices were fixed during World War I and supported through purchase programs from the Federal Farm Board.

Table 41--Barge rates for grain shipped from Minneapolis/St. Paul to New Orleans

Date	Rate	Date	Rate
	Dollars per net ton		Dollars per net ton
July 1978	8.98	March 1982	12.62
September 1978	9.90	April 1982	10.37
October 1978	15.88	May 1982	10.26
March 1979	12.38	June 1982	9.54
April 1979	12.11	July 1982	10.06
May 1979	14.80	August 1982	9.00
July 1979	12.69	September 1982	9.46
August 1979	19.69	October 1982	11.14
September 1979	20.67	November 1982	10.99
October 1979	20.83	March 1983	8.98
November 1979	11.76	April 1983	8.67
March 1980	15.63	May 1983	8.05
April 1980	12.81	June 1983	8.20
May 1980	9.75	July 1983	7.89
June 1980	11.42	August 1983	7.89
July 1980	13.04	September 1983	8.51
August 1980	17.10	October 1983	8.67
September 1980	16.55	November 1983	8.67
October 1980	20.96	March 1984	12.07
November 1980	21.16	April 1984	9.44
April 1981	9.90	May 1984	8.36
May 1981	12.74	June 1984	9.13
June 1981	10.90	July 1984	9.13
July 1981	10.55	August 1984	9.13
August 1981	10.76	September 1984	8.82
September 1981	11.14	October 1984	10.68
October 1981	15.49	November 1984	10.68
November 1981	14.83	April 1985	8.98

Source: (26).

Programs of the Forties

During the forties, agricultural policy centered on high support rates to encourage production of agricultural commodities during and after World War II. The Steagall Amendment of 1941 gave the Secretary of Agriculture discretion to authorize price supports for nonbasic commoditites at not less than 85 percent of parity. Oat prices, however, were not supported until 1945.

Table 42--Representative rail rates for oats

Date	Superior, WI, to Minneapolis, MN	Watertown, SD, to St. Joseph, MO
	Dollars per cwt	
January 1, 1976	0.395	1.015
October 17, 1976	.415	1.065
January 1, 1977	.430	1.110
November 30, 1977	.450	1.165
June 17, 1978	.470	1.210
December 15, 1978	.510	1.320
February 25, 1979	.515	1.330
June 5, 1979	.520	1.345
July 7, 1979	.530	1.360
July 28, 1979	.530	1.380
September 14, 1979	.540	1.390
October 15, 1979	.585	1.510
January 18, 1980	.590	1.530
February 27, 1980	.600	1.560
April 1, 1980	.630	1.640
April 11, 1980	.640	1.660
May 23, 1980	.640	1.670
July 12, 1980	.690	1.770
December 31, 1980	.720	1.960
January 17, 1981	.730	1.880
February 20, 1981	.740	1.900
April 7, 1981	.740	1.920
April 10, 1981	.730	1.900
June 5, 1981	.740	1.910
July 1, 1981	.760	1.960
October 1, 1981	.770	1.990
January 1, 1982	.810	2.080
January 1, 1983	.820	2.100
August 8, 1983	.880	1.750
January 1, 1984	.920	1.920

Source: (62).

The Agricultural Act of 1948 continued mandatory price support at 90 percent of parity for the 1949 crops of wheat, corn, rice, peanuts used as nuts, cotton, and tobacco marketed before June 30, 1950, if producers had not disapproved marketing quotas. If funds were available, price supports were authorized for other commodities, including oats, through December 31, 1949, at a fair relationship with other commodities receiving support.

The Agricultural Act of 1949 authorized price supports for basic commodities at 90 percent of parity through 1950. Support prices for nonbasic commodities, including oats, were generally set at lower levels during 1949 and 1950 than in 1948, whenever permitted by law.

Programs of the Fifties

The high support levels established in the 1949 Act were continued into the early fifties. These high levels were justified based on food and fiber needs during the Korean war when most of the CCC-owned stocks acquired from the 1948 and 1949 crops were sold. Despite these high support rates, only a modest amount of oats went into CCC inventories (table 43).

The Agricultural Act of 1954 established commodity price supports on a flexible basis, ranging 82.5-90 percent of parity for 1955 and 75-90 percent thereafter, excluding tobacco. The transition to flexible support was to be eased by acreage set asides for the basic commodities.

Price supports for oats became mandatory with the Agricultural Adjustment Act of 1956. The support level was 76 percent of parity in 1956 and not less than 70 percent of parity in 1957. The Agricultural Act of 1958 set a price support for oats that would be fair and reasonable in relation to the support level for corn. Subsequent legislation affecting corn price support made the same proportional requirements for oats and other feed grains.

Programs of the Sixties

Low farm income, excessive production, and large Government stocks of grain were prevalent at the close of the fifties. Total carryover stocks of corn climbed to an all-time high of 1.8 billion bushels in 1960. The wheat carryover was also high at 1.4 billion bushels, nearly all of which was held by the Government. Corn prices were down to a season average $1 per bushel in 1960, the lowest since 1942. Wheat prices at $1.74 were their lowest since 1945, and cotton and oats were priced below their averages for the fifties. Emergency feed grain legislation consequently was enacted in 1961 providing higher support levels for farmers who voluntarily reduced acreage of corn and grain sorghum by 20 percent or more. The voluntary diversion programs of the sixties were generally aimed at commodities such as wheat, cotton, corn, sorghum, and sometimes barley. Oats were not included. Direct payments were also made to some commodities, such as corn and sorghum, but not oats.

The Agricultural Act of 1965 permitted farmers with a history of oats or rye acreage to ask for an oats-rye base. Farmers participating in both the wheat and feed grain programs, could substitute wheat on the oats-rye base after meeting a diversion percentage. The purpose of this program was to provide an opportunity to some farmers to increase wheat acreage from land that had been in oats or rye in the fifties. This act covered the 1966 through 1970 marketing years.

Programs of the Seventies

The Agricultural Act of 1970 introduced set-asides but eliminated the need for the oats-rye base because wheat acreage was no longer constrained by an allotment. The act's feed grain program covered corn, grain sorghum, and barley if designated by the Secretary of Agriculture. The act also continued

Table 43--Oats: U.S. price support operations, by crop year

Crop year beginning July 1	Loan rate 1/	Farm price 1/	Put under support: Quantity	Put under support: Percentage of production	Acquired by CCC	Owned by CCC, year end
	Dollars per bushel		Million bushels	Percent	Million bushels	
1950	0.71	0.79	15.0	1.1	0.4	9.0
1951	.72	.82	13.1	1.0	.6	4.8
1952	.78	.79	21.7	1.8	13.5	13.2
1953	.80	.742	56.0	4.9	43.5	15.6
1954	.75	.714	74.9	5.3	59.7	40.5
1955	.61	.600	69.1	4.6	36.3	58.5
1956	.65	.686	36.1	3.1	17.7	26.7
1957	.61	.605	61.8	4.8	42.9	26.7
1958	.61	.578	84.6	6.0	48.3	42.4
1959	.50	.646	6.3	.8	.1	14.5
1960	.50	.599	19.7	1.7	.5	9.0
1961	.62	.642	20.6	2.0	8.4	14.3
1962	.62	.624	32.0	3.2	19.0	17.1
1963	.65	.622	38.9	4.0	31.9	28.3
1964	.65	.631	44.9	5.3	25.1	42.2
1965	.60	.622	43.9	4.7	6.8	50.6
1966	.60	.666	22.7	2.8	6.5	47.8
1967	.63	.659	37.2	4.7	19.5	45.2
1968	.63	.598	94.9	10.1	35.6	54.2
1969	.63	.584	152.4	15.7	62.0	104.3
1970	.63	.623	108.8	11.9	26.6	168.9
1971	.54	.604	81.9	9.3	.7	178.1
1972	.54	.724	31.8	4.6	0	104.9
1973	.54	1.18	19.4	1.6	0	23.9
1974	.54	1.53	3.9	.6	0	5.8
1975	.54	1.45	3.9	.6	0	0
1976 2/	.72	1.56	4.6	.8	0	0
1977	1.03	1.09	82.9	11.0	0	0
1978	1.03	1.20	25.1	4.2	1.3	2.7
1979	1.08	1.36	12.0	2.2	.2	2.7
1980	1.16	1.79	6.3	1.4	0	2.3
1981	1.24	1.89	9.7	1.9	.4	.7
1982	1.31	1.49	9.2	1.5	.7	.6
1983	1.36	1.67	3.6	.8	.1	1.5
1984	1.31	1.69	3.2	.7	.1	1.4
1985	1.31	1.25	5.4	1.0	.6	2.0

1/ Reflects June through May crop year.
2/ Beginning in 1976, marketing year begins June 1.
Source: (54, 60).

a two-tiered system of supports with minimum loan levels and an additional price support payment. Price supports on corn were set at the higher of $1.35 per bushel or 70 percent of parity and the loan at not less than $1 nor greater than 90 percent of parity. Rye and oats farmers were eligible for loans but not price support payments.

The Agriculture and Consumer Protection Act of 1973, effective for the 1974-77 crops, emphasized holding down price increases and expanding production in response to rising world demand for food and fiber. A new concept of target prices was introduced to replace price supports. Target prices, which were not specified for oats, covered corn and sorghum, and, if designated by the Secretary, barley. The 1973 Act had no specific provision for oats other than mandatory price support loans.

The Food and Agriculture Act of 1977 mandated target price protection for corn and sorghum but made target prices optional for oats and barley. The target price level for sorghum and barley was established as a fair and reasonable rate in relation to corn. Target prices were based on costs of production. Sorghum and barley target prices were established based on the same cost components as for corn. Oats were not designated for target price protection but were eligible for the 3-5 year farmer-owned reserve which provided separate loan rates and a reserve storage payment, initially set at $0.19 per bushel per year and later changed to $0.20. The act authorized a set-aside program, which was never implemented during this period, if the Secretary of Agriculture determined that supplies were likely to be excessive. The set asides were to be based on a percentage of the farmer's acreage planted for harvest in that year. Under the 1973 legislation, set asides were based on a percentage of allotment.

Programs of the Eighties

The Federal Crop Insurance Act of 1980 terminated most disaster payments, expanding the Federal Crop Insurance Program with subsidized payments instead. Additional price support was provided and the farmer-owned reserve was made more attractive. Loan rates to farmers in the reserve were raised above the regular loan rate. For example, the regular oats loan rate was $1.16 per bushel and the reserve loan rate was $1.23 per bushel; the regular corn loan rate was $2.25 per bushel and the reserve loan rate was $2.40 per bushel.

The Agriculture and Food Act of 1981 was prepared in a time of great concern over export embargoes, farm income, and the effect of price support policies on farm structure. The cost of the act was also a concern because of growing Federal deficits. Thus, a goal was to reduce the role and expense of Government in agriculture. The two-tiered system of target prices and loans was continued for designated crops, including oats for the first time, along with acreage controls and the farmer-owned reserve. The tie between target prices and inflation rates was broken and specific levels, lower than farm interests wanted, were mandated for each year 1982-85. Target prices for oats were $1.50 per bushel in 1982, increasing to $1.60 by 1985. The act authorized the Secretary to raise target prices to meet rising production costs and to require farmers to place a certain percentage of a crop's base acreage into conservation uses in order to qualify for price and income supports. The act also gave the Secretary discretion to adjust interest charges and storage payments to encourage participation.

Recent legislation has been aimed at reducing supply. The 1982 feed grain crop had a voluntary acreage reduction program of 10 percent and the Omnibus Budget Reconcilation Act of 1982 required a larger diversion of 15 percent for feed grains. Diversion payments were made on 5 percent of the land retired. On January 11, 1983, USDA announced the payment-in-kind (PIK) program which provided an added incentive to reduce production with payments made in Government-owned commodities. Despite these supply control programs, only 100,000 acres of oats were diverted from production in 1982, 300,000 acres in 1983, and 100,000 acres each in 1984 and 1985.

The trend to reduce costs of price support programs continued with the Agricultural Programs Adjustment Act of 1984. That act froze 1985 target prices for feed grains, Upland cotton, and rice at their 1984 levels. Acreage reductions for feed grains, including oats, varied 5-20 percent, depending upon estimated carryover.

The Food Security Act of 1985 was signed into law at a time when U.S. farm commodities were uncompetitive in the world market. Lagging exports contributed to mounting inventories and declining farm income became a major factor in the farm sector's financial crisis. Objectives for the 1985 Act were to expand exports, protect farm income, and eventually reduce Federal outlays for farm programs as well as Government intervention in the agricultural sector. Despite these conflicting objectives, the apparent goals for the 1986 program were to lower market prices and expand exports, protect farm income with direct payments, and minimize budget outlays by using in-kind payments, if possible.

Many of the same policy parameters remain with the 1985 Act as with the 1981 Act, but the Secretary has considerably more discretion (22, 50). For example, loan rates may be adjusted to achieve competitive conditions or repayment of these loans may be less than the basic loan rate. 7/ Target prices, under the 1985 Act remain constant in 1986 and 1987 for most commodities and thereafter may gradually decline by about 10 percent during 1988-90. The Secretary retains discretionary power with acreage reduction programs, but such programs become mandatory if stocks reach a certain level. Likewise, the act continues the farmer-owned reserve but sets both minimum and maximum entry levels.

The 1985 Act added several new facets in farm policy such as allowing loan support prices to more closely follow market prices, thereby allowing support prices to respond to world supply and demand conditions. Loan rates for specified commodities may be repaid at existing market prices if these prices drop below loan rates. Also new is the acreage conservation reserve of 40-45 million acres which was established to reduce erosion but which will simultaneously reduce production potential. The cropland base could decrease 10 percent by 1990. The formulas for computing acreage bases and program yields have been changed and will reduce the tie between production and eligibility for Government payments. The Secretary may also institute advance nonrecourse loans which could further boost a farmer's cash-flow.

7/ Although a marketing loan program was introduced with the 1985 Act, it was not implemented for the 1986 oats crop nor will it be implemented for the 1987 crop.

Loan rates can now adjust to market prices and may be lowered more if deemed necessary by the Secretary in order to become competitive. For example, feed grain loan rates for 1986-90 will be 75-85 percent of the previous average 5-year market price, excluding high and low years. Rates cannot drop by more than 5 percent from the previous year. The Secretary has the discretionary power to lower loan rates by up to 20 percent in 1986-90, if the previous marketing year's average price was not greater than 110 percent of that year's loan rate or if such action is necessary to regain a competitive market position.

Loan rates for oats are set at levels that the Secretary determines are fair and reasonable in relation to the level for corn and that reflect factors such as relative feed values. Loan rates for the 1986 crop of oats were set at $0.99/bushel, and corn was set at $1.92/bushel, a difference reflecting feed value.

Deficiency payments for oats have been the main income transfer mechanism since 1983 followed by either paid land diversion, reserve program storage payments, or disaster payments. Deficiency payments will continue and probably be larger because target prices are frozen for 1986 and 1987 and loan rates and market prices are lower. Although target prices may decline slightly during 1988-90, sufficient target price protection remains for producers. The deficiency payment limit of $50,000 per person is effectively increased because of added exemptions. These additions include loans and purchases, loan deficiency payments realized through the marketing loan provision, forgone loans in return for payments, additional deficiency payments due to an additional downward adjustment in loan rates, and inventory reduction payments. A maximum 5 percent of the total deficiency payments may be made in kind. Thus, CCC inventories can be reduced at no additional budget outlay to the Government.

Target prices for the 1986 crop of oats were set at $1.60/bushel, compared with corn's $3.03/bushel. The target price for oats, if designated by the Secretary, must be fair and reasonable in relation to the payment rate established for corn. Target prices for oats are also based on their feed value in relation to corn, about 51-52 percent of the price of corn.

Effects of the Oats Farm Programs

Oats producers benefit from participating in Government programs through price support (regular or reserve nonrecourse loans) or income support (deficiency payments) because their price risk is minimized. Nonparticipants also benefit indirectly from supported market prices. Both participating and nonparticipating oats producers will benefit from the price-enhancing effects of the other feed grain programs.

Producer Benefits

Both the regular and reserve price support loan programs provide an orderly marketing mechanism which strengthens prices and reduces downward price risk. Program participants can receive a regular loan on their oats and either pay back the principal plus interest or forfeit the grain. In times of tight cash-flow or strict credit qualifications by lending institutions, price support loans become very attractive to farmers. The reserve loan can be even more attractive in times when reserve loan rates are higher than regular loan rates and at least part of the interest cost is waived as was the case with the 1982 crop. Loan rates in general support prices, minimizing the risk of lower prices. Loan rates had little impact on farm prices during 1972-84 because prices were considerably higher than loan rates.

Acreage reduction programs also strengthen prices. Although price strength is associated with reduced supply, these programs have not been used very frequently with oats.

Distribution of Benefits

Direct payments (deficiency, diversion, disaster, and storage) for fiscal years 1983 and 1984 totaled $6.1 million and $8.3 million, respectively. Most of these payments were for the 1983 oats crop (table 44). The distribution of these payments was concentrated in the Northern Plains States because about half of the U.S. base was located in this region. Furthermore, about 72 percent of the complying base acreage was planted within this region.

Based on a participation pattern of 1982, the 1983 payments were distributed as follows (35):

- About 60 percent of all payments were made to oats-producing farms with 500 or more acres of cropland, about 33 percent of the participating producers; and

- 40 percent of all payments were made to oats producers with less than 500 acres of cropland, about 67 percent of the participants.

Program Activity

Program activity varied from price support to direct payments (table 44). Price support began in 1945 and continues to the present, peaking during the 1971 crop year when the stock-to-use ratio reached 70 percent and farm prices received declined to $0.604 per bushel, the lowest since 1957 (table 45). The surge in export demand beginning in 1972-73 caused loan activity to decline as farmers redeemed their loans and sold their oats directly in the market. During fiscal year 1983, price and income supports cost about $11.2 million compared with $103.7 million in fiscal year 1970 or $1.5 million in fiscal year 1985 (table 44). During fiscal year 1983 price support operations cost about $5.1 million and direct payments totaled $6.1 million. Deficiency and diversion payments were first made for oats in fiscal year 1983 which applied to the 1983 oats crop.

Indirect Program Effects

Although these programs provide benefits to producers, costs are increased for the livestock sector, a major component of demand, and for consumers of livestock and oat products. Higher oats prices represent increased input costs which affect livestock producers' decisions or consumers of oats food products.

Government programs for oats have affected land values, trade, and resource use. Program benefits are capitalized into land values especially when programs are associated with bases or allotments. Thus, landowners' wealth and current income would increase. Renters or tenants, about 55 percent of

Table 44--Net budgetary expenditures for oats by fiscal year

Fiscal year	Loans made	Loans repaid 1/	Net lending	CCC & FOR storage 2/	Deficiency payments	Diversion payments	Disaster payments	Sales proceeds 1/	Miscellaneous expenditures or receipts 1/	Total net expenditures
	Thousand dollars									
1961	9,600	(5,000)	4,600	0	0	0	0	(3,400)	7,600	8,800
1962	10,800	(9,700)	1,100	3,600	0	0	0	(3,800)	1,100	2,000
1963	16,500	(7,700)	8,800	4,000	0	0	0	(4,100)	300	9,000
1964	22,300	(4,700)	17,600	5,000	0	0	0	(1,800)	2,100	22,900
1965	22,700	(9,300)	13,400	8,600	0	0	0	(7,200)	2,200	17,000
1966	23,000	(10,100)	12,900	9,100	0	0	0	(9,000)	4,700	17,700
1967	12,100	(13,400)	(1,300)	9,800	0	0	0	(11,600)	1,200	(1,900)
1968	21,100	(11,800)	9,300	8,000	0	0	0	(2,400)	300	15,200
1969	52,105	(12,681)	39,424	8,795	0	0	0	(239)	4,232	52,212
1970	87,448	(13,417)	74,031	17,260	0	0	0	(1,365)	13,796	103,722
1971	60,199	(28,711)	31,488	32,741	0	0	0	(8,315)	18,584	74,498
1972	39,951	(21,582)	18,369	39,148	0	0	0	(13,489)	11,570	55,598
1973	15,508	(58,747)	(43,239)	27,779	0	0	0	(46,697)	3,084	(59,073)
1974	5,323	(58,993)	(53,670)	16,579	0	0	0	(51,404)	1,806	(86,689)
1975	2,153	(3,467)	(1,314)	10,881	0	0	0	(33,787)	3,377	(20,843)
1976	2,144	(1,696)	448	6,523	0	0	0	(26,287)	3,568	(15,748)
1977	47,875	(2,887)	44,988	760	0	0	0	(4,264)	805	42,289
1978	46,378	(29,013)	17,365	7,409	0	0	0	(16)	247	25,005
1979	15,912	(33,295)	(17,383)	6,829	0	0	0	(58)	45	(10,567)
1980	11,231	(27,570)	(16,339)	3,374	0	0	0	(56)	295	(12,726)
1981	10,685	(29,083)	(18,398)	(1,874)	0	0	0	(61)	118	(20,215)
1982	9,575	(9,462)	113	863	0	0	148	(2,563)	(27)	(1,466)
1983	8,784	(3,638)	5,146	981	1,627	3,330	154	(1)	(29)	11,208
1984	5,324	(9,047)	(3,723)	693	3,328	4,193	39	(131)	(49)	4,350
1985	4,280	(3,388)	892	721	73	10	0	(166)	1	1,531
1986 4/	7,663	(685)	6,978	1,676	17,165	18	0	(181)	516	26,172

1/ Parentheses indicate receipts.
2/ Includes reseal storage payments for fiscal years 1962-75. CCC = Commodity Credit Corporation. FOR = Farmer-owned reserve.
3/ Excludes fiscal year 1986 certificate transactions.
Source: (56).

Table 45--Stocks-to-use ratios, farm prices, and policy parameters

Crop year 1/	Stocks-to-use ratio	Farm price	Policy parameters		
			Loan rate	Target price	Direct payments
	Percent	Dollars per bushel			
1950	27	0.788	0.71	0	0
1951	25	.820	.72	0	0
1952	23	.789	.78	0	0
1953	23	.742	.80	0	0
1954	28	.714	.75	0	0
1955	29	.600	.61	0	0
1956	23	.686	.65	0	0
1957	32	.605	.61	0	0
1958	33	.578	.61	0	0
1959	27	.646	.50	0	0
1960	35	.599	.50	0	0
1961	31	.642	.62	0	0
1962	32	.624	.62	0	0
1963	39	.622	.65	0	0
1964	36	.631	.65	0	0
1965	43	.622	.60	0	0
1966	37	.666	.60	0	0
1967	40	.659	.63	0	0
1968	50	.598	.63	0	0
1969	65	.584	.63	0	0
1970	64	.623	.63	0	0
1971	70	.604	.54	0	0
1972	56	.724	.54	0	0
1973	38	1.18	.54	0	0
1974	33	1.53	.54	0	0
1975	31	1.45	.54	0	0
1976	28	1.56	.72	0	0
1977	52	1.09	1.03	0	0
1978	45	1.20	1.03	0	0
1979	41	1.36	1.08	0	0
1980	34	1.79	1.16	0	0
1981	28	1.89	1.24	0	0
1982	42	1.49	1.31	1.50	0
1983	33	1.67	1.36	1.60	.11
1984	35	1.69	1.31	1.60	0
1985	33	1.25	1.31	1.60	.29

1/ Reflects May through June crop year.
Source: (60).

the farmers growing oats, would also receive an increase in current income, but their rental cost would also increase because of rising land values. Although still present, these effects were lessened somewhat when program participation was tied to a current base instead of historical bases or allotments. Only 2 years of records are necessary to establish a base for a program crop.

High loan rates and prices and a strong dollar contributed to declining exports of oats and other coarse grains. Loan rates which are high in relation to world prices encourage importers to buy from competing countries, tending to expand their oats acreage in those countries. The strong dollar also encouraged a greater volume of imports than normal in recent years.

WORLD PRODUCTION, CONSUMPTION, STOCKS, AND TRADE

Oats rank sixth in world cereal production behind wheat, maize, rice, barley, and sorghum. World production of oats, however, has been trending downward due in part to emphasis placed on competitive crops with greater amounts of energy or protein. The Soviet Union, United States, and Canada produced at least 55 percent of world oats grain during 1960-85, with the Soviet Union surpassing the United States as the top producing country. World grain yields have been greatest in countries such as West Germany and Sweden because of good varieties and intensive cultural management practices. Livestock feed accounted for about three-fourths of total world oats grain consumption during 1980-85. Despite a decline in production, the United States still holds about half of the world stocks of oats. Oats grain trade has been low in volume with only 1-2 million metric tons traded annually in the past 25 years.

Production

World production of oats for grain averaged 50 million metric tons in the sixties (table 46). Production rose to an average 52.5 million tons in 1970-74, but declined about 14 percent to 45.3 million tons in 1980-85. Production of oats generally increased in the Soviet Union, West Germany, and China and declined in the United States, Canada, and Poland. In many parts of the world, oats are grown for multiple uses, such as pasture, forage, grain, or bedding. Oats account for only 5-7 percent of world coarse grain production.

Ten major oats-producing countries accounted for 80-90 percent of world oats grain production during 1960-85 (table 46). The Soviet Union, United States, and Canada alone have accounted for slightly more than 55 percent of world production. Oats thrive in cool, moist climates and are particularly sensitive to hot, dry weather from head emergence to harvest. Oats production is generally concentrated between latitudes 35°-50° north and 20°-40° south. Although production and yields have increased in Australia over the past two decades, oats in the Southern Hemisphere are used primarily as a forage crop for cattle in countries such as Argentina or Uruguay.

During 1960-85, the Soviet Union and the United States switched roles as the major oats-producing country in the world. Production in the Soviet Union accounted for an average of 14.6 percent of the world total during 1960-64, second to the United States' 29.3-percent share. By 1980-85, the Soviet Union led with an average 35.6 percent of world production, compared with the United

Table 46--World oats production, yield, and area harvested, by major producing countries

Country	1960-64	1965-69	1970-74	1975-79	1980-85
			1,000 metric tons		
Average production:					
Soviet Union	7,214.8	10,335.0	15,153.0	16,544.0	16,107.3
United States	14,496.6	12,900.6	10,867.8	8,826.4	7,330.5
Canada	6,073.2	5,515.0	4,945.6	4,042.6	3,048.8
Germany, Fed. Rep. of	2,210.6	2,595.8	2,987.0	3,280.4	3,627.7
Poland	2,700.4	2,746.4	3,216.0	2,569.0	2,549.8
Australia	1,227.6	1,344.2	1,121.0	1,275.4	1,466.0
China	1,069.0	1,316.0	1,407.0	1,577.8	1,695.0
Sweden	1,271.6	1,320.6	1,615.6	1,412.4	1,647.7
Finland	845.6	1,008.8	1,256.2	1,282.0	1,255.3
France	2,628.0	2,549.0	2,278.0	1,871.0	1,761.5
Subtotal	39,737.4	41,631.4	44,847.2	42,681.0	40,489.6
			Percent		
Share of world	80.3	82.9	85.3	87.2	89.4
			1,000 metric tons		
Total world	49,500.4	50,224.6	52,548.8	48,931.6	45,289.2
			Metric tons per hectare		
Average yield:					
Soviet Union	0.82	1.256	1.42	1.36	1.31
United States	1.57	1.80	1.08	1.84	2.03
Canada	1.61	1.77	1.86	1.95	2.05
Germany, Fed. Rep. of	2.89	3.23	3.60	3.65	4.08
Poland	1.67	2.01	2.42	2.28	2.47
Australia	.89	.87	.94	1.14	1.13
China	.82	.93	.98	1.05	1.20
Sweden	2.54	2.84	3.30	3.09	3.69
Finland	1.78	2.11	2.37	2.62	2.84
France	1.99	2.55	3.03	3.05	3.73
Total world	1.41	1.63	1.73	1.69	1.75
			1,000 hectares		
Average area harvested:					
Soviet Union	8,555.6	8,155.2	10,738.8	12,147.6	12,255.5
United States	9,220.2	7,137.8	5,996.6	4,784.0	3,622.2
Canada	3,729.2	3,107.4	2,648.6	2,065.0	1,484.2
Germany, Fed. Rep. of	762.4	798.6	828.2	892.0	777.3
Poland	1,614.0	1,366.0	1,334.4	1,125.4	1,034.8
Australia	1,369.0	1,511.4	1,173.6	1,108.2	1,264.2
China	1,293.6	1,410.2	1,438.2	1,492.6	1,453.3

Continued--

Table 46--World oats production, yield, and area harvested, by major producing countries--Continued

Country	1960-64	1965-69	1970-74	1975-79	1980-85
			1,000 hectares		
Sweden	502.0	464.8	489.4	456.4	445.8
Finland	466.6	475.6	528.6	487.4	440.3
France	1,321.2	1,000.8	752.2	616.6	474.2
Subtotal	28,833.8	25,427.8	25,928.6	25,175.2	23,251.8
			Percent		
Share of world	81.7	82.7	85.2	86.8	89.6
			1,000 hectares		
Total world	35,311.4	30,719.2	30,419.4	28,993.0	25,985.2

Source: (66)

States' 16.2-percent share. The Soviet Union's increase in oats production is due mainly to modernization and expansion of its agriculture.

Oats are better suited to the cool, humid climate and acidic soils of the northern parts of the Soviet Union, than are competing crops such as wheat and barley. Oats have served well as a livestock ration for the Soviet Union's growing livestock industry. In the United States, oats production declined due, in part, to alternative crops that were more profitable or to declining dairy cattle numbers.

Area Harvested and Yield

Area harvested for world oats averaged 35.3 million hectares in 1960-64, gradually declining to 26 million hectares (table 46). During 1960-85, the Soviet Union increased its area harvested, while the harvested area declined in the United States, Canada, Poland, and France.

World yields peaked at an average of 1.75 metric tons per hectare in 1980-85, up from 1.41 metric tons in 1960-64 (table 46). Since World War II, oats yields have about doubled for the world because of improved production practices and improved disease-resistant strains.

Yields for countries such as the Soviet Union, Australia, and China are generally less than the world average, while average yields for the Federal Republic of Germany, Poland, Sweden, Finland, and France have exceeded the world average. Major producing countries, such as the Soviet Union, United States, and Canada, tend to sacrifice yields partly because of less intensive management practices compared with European countries. Several European countries, such as the Federal Republic of Germany and Sweden, have outstanding yields because of good varieties, a long growing season, and excellent cultural management practices.

Consumption

Consumption of oats is concentrated in the major producing countries (table 47). Most of the oats grain is consumed as animal feed, 75 percent of total consumption. Food and seed use account for 22 percent, and the remaining 3 percent is exported. Countries such as the Soviet Union, United States, Canada, the Federal Republic of Germany, and Poland account for more than 60 percent of world feed use. Food consumption of oats in most countries tends to be relatively low. The United States and the United Kingdom lead others in the consumption of rolled oats. However, food consumption of oats in the United States accounts for only about 8 percent of total disappearance.

Stocks

World carryover stocks averaged 5.3 million metric tons in 1980-85, down from 9.7 million tons in 1970-74 (table 48). Despite the decline in oats production, the United States still held an average 2.6 million metric tons during 1980-85, almost half of the world oats stocks. The U.S. stocks-to-use ratio for 1985 was 30 percent, nearly three times the world ratio of 11 percent (table 49).

Trade

Trade in the world oats grain market is variable but low in volume. World trade in oats averaged 1.4 million metric tons annually during 1960-85 with a range of 1-2 million metric tons, about 2-4 percent of production (tables 50 and 51). Most countries produce oats for the domestic market and export oats only when production exceeds domestic use. The extent of trade also depends on the availability of other feed grains in the world market. Oats are less likely to be traded than other grains because of their light weight and bulky characteristics which make transport costs prohibitive. The oats export market may not be too dependable when compared with other grains.

Major exporting countries are the United States, Canada, Australia, Sweden, Finland, France, and Argentina. Together, these countries exported 85 percent of world oats in 1980-85. Exports for the Soviet Union, United States, Canada, Federal Republic of Germany, and Argentina have trended downward, while countries such as Australia, Sweden, Finland, and France have been trending upward. Exports in relation to production have been low for the larger producing countries but much greater (8-20 percent) for countries such as Australia, Sweden, Finland, France, and Argentina.

Imports of oats are concentrated in countries such as Japan, Federal Republic of Germany, German Democratic Republic, Italy, and Switzerland. These countries have been traditional importers. During 1980-85, the United States began to import more oats, and during 1982-85 it became a net importer, in contrast to its net export role during 1955-81.

The U.S. Role

The U.S. market share of world oats trade averaged 16 percent in the sixties, rose to 21.7 percent during 1970-74, then dropped to 5 percent during 1980-85. Since the U.S. export surge in 1973, when the Soviet Union imported

Table 47--World oats consumption patterns by major countries

Country	1960-64	1965-69	1970-74	1975-79	1980-85
			1,000 metric tons		
Average total consumption:					
Soviet Union	7,214.8	10,335.0	15,318.2	16,664.4	16,174.0
United States	14,509.4	12,296.8	11,829.0	8,802.0	7,730.7
Canada	5,999.2	5,458.6	5,188.2	4,115.6	3,100.3
Germany, Fed. Rep. of	2,566.8	3,021.8	3,476.2	3,640.2	3,342.0
Poland	2,732.4	2,722.4	3,286.6	2,657.8	2,555.8
Australia	1,227.6	1,184.2	1,226.6	1,226.0	1,524.8
China	1,136.4	1,316.0	1,406.6	1,577.8	1,695.0
Sweden	1,280.0	1,328.2	1,642.4	1,410.0	1,621.0
Finland	851.4	1,010.2	1,258.0	1,279.0	1,268.5
France	2,673.6	2,447.2	2,284.6	1,874.8	1,731.1
Subtotal	4,0191.6	41,120.4	46,916.4	43,247.6	40,743.2
			Percent		
Share of world	79.4	81.3	84.7	86.0	85.6
			1,000 metric tons		
Total world	50,732.6	50,582.2	55,411.2	50,303.6	47,606.2
Average domestic feed use:					
Soviet Union	5,063.2	7,470.8	11,095.6	11,774.2	11,494.8
United States	12,581.6	10,589.8	10,188.6	7,483.6	6,536.7
Canada	5,396.4	5,044.2	4,760.8	3,633.2	2,800.8
Germany, Fed. Rep. of	2,223.4	2,680.4	3,048.2	3,232	2,999.2
Poland	2,359.4	2,385.2	2,866.2	2,368.4	2,180.8
Australia	626.4	598.4	700.8	631.0	1,070.0
China	0	0	0	0	0
Sweden	1,084.4	1,055.8	1,228.0	1,130.8	1,173.5
Finland	708.4	861.2	1,093.4	1,048.2	1,006.3
France	2,254.4	2,277.2	1,969.4	1,542.2	1,386.5
Subtotal	32,297.6	32,963.0	36,951.0	32,843.6	30,648.6
			Percent		
Share of world	79.3	81.5	84.7	86.0	85.2
			1,000 metric tons		
Total world	40,752.2	40,451.6	43,610.2	38,174.6	35,958.3
Average food and seed use:					
Soviet Union	2,085.8	2,854.4	4,203.2	4,890.2	4,679.2
United States	1,703.8	1,518.6	1,276.4	1,177.4	1,122.0
Canada	416.0	317.6	332.0	278.6	237.7

Continued--

Table 47--World oats consumption patterns by major countries -- Continued

Country	1960-64	1965-69	1970-74	1975-79	1980-85
			1,000 metric tons		
Germany, Fed. Rep. of	317.6	316.0	393.8	382.6	336.6
Poland	373.0	330.0	411.2	289.2	375.0
Australia	308.6	299.2	222.0	224.2	205.8
China	0	0	0	0	0
Sweden	110.8	133.8	150.0	125.4	126.8
Finland	139.8	140.0	83.2	202.0	117.7
France	396.6	170.0	164.0	136.8	375.5
Subtotal	5,852.0	6,079.6	7,235.8	7,427.8	7,576.3
			Percent		
Share of world	67.5	68.3	71.3	69.7	73.9
			1,000 metric tons		
Total world	8,732.6	8,899.0	10,141.6	10,653.6	10,249.0

Source: (66).

Table 48--Average carryover stocks of oats by major producing countries

Country	1960-64	1965-69	1970-74	1975-79	1980-85
			1,000 metric tons		
Soviet Union	0	0	0	0	0
United States	4,384.2	5,756.6	6,278.6	3,475.8	2,604.5
Canada	2,016.8	1,822.6	1,489.2	1,390.0	808.8
Germany, Fed. Rep. of	528.0	443.8	380.6	298.8	351.6
Poland	162.0	168.0	140.0	113.4	113.
Australia	0	150.0	463.2	457.2	221.5
China	0	0	0	0	0
Sweden	182.0	190.8	188.8	104.4	185.5
Finland	80.2	71.6	151.0	107.0	217.8
France	195.2	95.0	43.0	32.8	69.2
Subtotal	7,548.4	8,698.4	9,134.4	5,979.4	4,572.2
			Percent		
Share of world	90.8	93.5	93.9	87.9	86.6
			1,000 metric tons		
Total of world	8,313.8	9,307.4	9,726.2	6,801.2	5,279.2

Source: (66).

Table 49--World and U.S oats production, imports, consumption, exports, and ending stocks

Year	Production			Imports			Consumption			Exports			Ending stocks		
	World	United States	U.S. share of world	World	United States	U.S. share of world	World	United States	U.S. share of World	World	United States	U.S. share of world	World	United States	U.S. share of world
	1,000 metric tons		Percent	1,000 metric tons		Percent	1,000 metric tons		Percent	1,000 metric tons		Percent	1,000 metric tons		Percent
1960	57,786	16,741	29.0	1,216	10	.1	56,416	15,538	27.5	1,189	389	32.7	8,454	4,709	55.7
1961	49,989	14,665	29.3	1,408	16	1.1	51,637	15,110	29.3	1,537	270	17.6	6,768	4,010	59.2
1962	49,565	14,692	29.6	1,422	63	4.4	48,335	14,470	30.0	1,319	335	25.4	8,201	3,960	48.3
1963	46,659	14,014	30.0	1,139	51	4.5	45,583	13,422	29.4	1,205	69	5.7	9,068	4,534	48.3
1964	43,503	12,371	28.4	1,305	53	4.1	45,144	12,837	28.4	1,472	57	3.9	8,080	4,717	50.0
1965	45,730	13,499	29.5	1,565	50	3.2	45,015	12,304	27.3	1,636	525	32.1	8,847	5,487	62.0
1966	47,772	11,656	24.4	1,264	55	4.4	48,831	12,305	25.2	1,270	246	19.4	7,700	4,601	59.8
1967	49,976	11,525	23.1	1,231	41	3.3	50,254	11,489	22.9	1,148	82	7.1	7,158	4,587	64.0
1968	53,470	13,804	25.8	1,210	26	2.0	50,210	12,213	24.3	1,130	53	4.7	10,534	6,154	58.4
1969	54,175	14,019	25.9	1,048	23	2.2	52,443	12,230	23.3	936	20	2.1	12,289	7,954	64.7
1970	54,069	13,285	24.5	2,080	24	1.2	53,848	12,733	23.6	1,908	255	13.3	12,635	8,288	65.6
1971	56,295	12,745	22.6	1,999	50	2.5	55,938	12,127	21.7	1,969	332	16.9	12,943	8,665	66.9
1972	50,058	10,024	20.0	1,637	35	2.1	53,725	11,788	21.9	1,654	286	17.3	9,469	6,726	71.0
1973	52,882	9,567	18.1	1,592	0	0	54,652	11,023	20.2	1,871	822	43.9	7,376	4,463	60.5
1974	49,440	8,718	17.6	1,172	0	0	50,596	9,654	19.1	1,109	156	14.1	6,200	3,251	52.4
1975	47,098	9,275	19.7	1,286	15	1.2	47,312	9,362	19.8	1,291	179	13.9	5,875	2,976	50.7
1976	48,906	7,838	16.0	1,551	15	1.0	49,062	8,318	16.7	1,539	33	2.1	5,782	2,380	41.1
1977	51,594	10,930	21.2	1,275	22	1.7	49,111	8,636	17.6	1,377	218	1.6	8,226	4,543	55.2
1978	51,566	8,443	16.4	1,336	13	1.0	51,552	8,748	17.0	1,601	53	3.3	7,996	4,064	50.8
1979	45,494	7,646	16.8	1,268	29	2.3	47,104	8,241	17.5	1,445	47	3.2	6,484	3,426	55.9
1980	44,551	6,659	15.3	976	15	1.5	45,507	7,342	16.1	1,290	209	1.6	4,861	2,569	52.8
1981	44,418	7,396	16.7	1,209	29	2.4	45,281	7,685	17.0	1,151	88	7.6	4,662	2,207	47.3
1982	47,062	8,602	18.3	941	215	22.8	46,184	7,614	16.5	1,040	46	4.4	6,140	3,193	52.0
1983	44,189	6,923	15.7	1,247	352	28.2	45,824	7,890	17.2	1,644	36	2.2	5,207	2,625	50.4
1984	45,495	6,875	15.1	1,802	495	27.5	45,962	7,369	16.0	1,789	15	.8	5,526	2,611	47.2
1985	47,087	7,528	16.0	1,292	365	28.3	48,386	8,052	16.6	1,430	30	2.1	5,191	2,422	46.7

Source: (66).

Table 50--World oats trade by major trading countries

Country	1960-64	1965-69	1970-74	1975-79	1980-85
			1,000 metric tons		
Average imports:					
Soviet Union	0	0	165.0	122.6	83.3
United States	38.6	39.0	21.8	18.8	245.2
Canada	16.2	0	28.6	7.6	7.5
Germany, Fed. Rep. of	361.8	453.6	482.8	336.8	199.0
Poland	12.0	6.0	52.6	80.4	27.0
China	67.4	0	0	0	0
Sweden	16.6	.4	17.8	5.6	1.2
Finland	15.0	.2	2.6	1.0	36.2
France	25.8	1.0	2	1.0	34.5
Japan	6.0	39.8	165.4	167.0	116.7
Italy	141.8	217.2	184.8	114.6	90.5
German Dem. Rep.	30.2	5.4	62.4	25.0	28.3
United Kingdom	37.8	20.0	18.4	42.2	18.7
Belgium/Luxembourg	45.2	82.0	60.0	72.8	56.0
Brazil	12.4	15.0	27.2	31.8	6.3
Ecuador	3.2	8.2	15.2	26.2	22.3
Netherlands	195.0	84.0	74.4	42.8	45.5
Switzerland	128.4	159.4	169.2	147.0	123.2
Ireland	19.6	9.8	10.8	12.6	3.7
Subtotal	1,173.0	1,141.0	1,559.2	1,255.8	1,145.1
			Percent		
Share of world	90.4	89.7	91.9	93.5	92.0
			1,000 metric tons		
Total world	1,298.0	1,271.6	1,696.0	1,343.2	1,244.5
Average exports:					
Soviet Union	65.8	9.8	19.4	0	0
United States	224.0	185.2	370.2	106.0	70.7
Canada	174.8	106.8	104.0	189.6	65.7
Germany, Fed. Rep. of	25.8	25.6	28.6	27.4	6.2
Poland	0	7.2	11.2	.2	0
Australia	336.2	275.8	316.8	336.4	236.0
Sweden	84.8	138.6	264.4	150.8	320.0
Finland	3.2	8.8	81.8	28.8	140.7
France	22.6	101.0	151.8	193.4	265.8
Argentina	297.8	196.6	158.6	218.0	85.0
Subtotal	1,235.0	1,055.4	1,506.8	1,250.6	1,190.1
			Percent		
Share of world	91.9	86.2	88.5	86.2	85.6
			1,000 metric tons		
Total world	1,344.4	1,224.0	1,702.2	1,450.6	1,390.7

Source: (66).

Table 51--World and U.S. oats trade and consumption

Year	World trade in relation to consumption	U.S. exports in relation to consumption
	Percent	
1960	2.1	1.0
1961	3.0	.7
1962	2.7	1.0
1963	2.6	.2
1964	3.3	.2
1965	3.6	1.6
1966	2.6	.7
1967	2.3	.2
1968	2.3	.1
1969	1.8	.1
1970	3.5	.6
1971	3.5	.8
1972	3.1	.7
1973	3.4	1.9
1974	2.2	.4
1975	2.7	.5
1976	3.1	.1
1977	2.8	.5
1978	3.1	.1
1979	3.1	.1
1980	2.8	.5
1981	2.5	.2
1982	2.2	.1
1983	3.6	.1
1984	3.9	1/
1985	3.0	.1

1/ Less than 0.1 percent.
Source: (66).

a large amount of U.S. oats because of tight feed grain supplies world wide, U.S. oats exports have declined to low levels, especially since 1982. Higher U.S. prices and a strong U.S. dollar have made exports from the United States less attractive. However, these factors could change because of the Food Security Act of 1985, one goal of which is to make U.S. commodities more competitive in the export market.

U.S. oats imports averaged nearly 40,000 metric tons in the sixties but dropped to about 20,000 tons in the 1970's. Most oats were imported from Canada because of quality preferences or price advantages. During 1980-85, oats imports averaged 245,200 metric tons per year, mostly from Scandanavian countries and Canada.

The United States became a net importer of oats during 1982-85, with most of the shipments coming from Sweden with lesser amounts from Canada and Finland. The Swedish oats were of generally superior quality (high in test weight and white in color) or offered economic advantages.

Between World Wars I and II, the United States was normally a net exporter of oats except in years of short crops. During 1939-55, however, this pattern changed, because imports exceeded exports in every crop year except 1941, 1946, and 1947. The United States again became a net exporter during 1955-81 (41).

Swedish oats were generally in surplus during 1982-85. Surplus oats were bought by the Swedish Government and withheld from the domestic commercial market (15, 32). One option available to the Swedish Government for disposing of the surplus oats is to export them at the world price. Because the price paid by the Government to its farmers is higher than the world price, a subsidy exists. The high value of the dollar and lower ocean freight rates made exporting the surpluses economically feasible.

Swedish oats delivered to gulf ports were competitive with U.S. prices. At times these oats were competitively priced with oats in Toledo and thus could be shipped by barge (the barge market was already depressed, and this haul is considered a backhaul which can be done for a very low rate) into Kentucky for less than U.S. oats. Swedish oats have mostly penetrated the Southeast market and to a lesser degree the Northeast.

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Appendix table 1--Fertilizer and lime used on oats, by State, 1978

State	Fertilizer					
	N 1/	P_2O_5 2/	K_2O 3/	Lime	Manure	Other
	Pounds per acre					
Illinois	6.16	13.92	19.00	520	937	0
Indiana	29.37	40.52	40.10	360	0	0
Iowa	12.18	20.28	19.49	740	0	0
Michigan	21.70	44.40	44.89	140	323	0
Minnesota	12.63	14.95	13.49	40	861	.98
Missouri	28.70	32.20	33.06	320	0	0
Montana	21.81	27.16	6.20	0	0	0
Nebraska	17.41	8.17	4.30	0	9	.33
New York	23.05	43.36	43.12	400	984	0
North Dakota	9.74	11.72	.12	0	0	0
Ohio	30.80	52.08	51.67	340	0	0
Pennsylvania	19.73	36.61	38.14	360	557	0
South Dakota	14.43	13.12	1.99	0	0	0
Wisconsin	4.45	18.78	37.90	380	3,520	0

1/ Nitrogen.
2/ Phosphate.
3/ Potassium.
Source: (33).

Appendix table 2--Fertilizer use on oats, 1983

State	Active ingredients							Trace elements			
	N[1]	P[2]	K[3]	Lime	Manure		Zinc	Sulphur	Magnesium	Calcium	Boron
	Pounds per acre										
Illinois	11.4	19.8	32.9	295	0	0	0	0	0	0	0
Indiana	35.2	41.3	40.8	103	0	0	0	0	0	0	0
Iowa	15.5	17.1	13.1	161	0	0	0	0	0	0	0
Kansas	33.6	18.7	5.3	0	149	0	0	0	0	0	0
Michigan	28.8	47.6	56.7	329	0	0	0	0	0	0	0
Minnesota	13.9	13.7	12.2	59	325	0	0	0	0	0	0
Nebraska	29.3	18.6	3.3	0	0	0	.3	.2	0	0	0
New York	33.1	39.6	42.1	692	0	0	0	.1	0	0	0
North Dakota	20.1	11.7	0.7	0	0	0	0	0	0	0	0
Ohio	30.6	53.2	68.0	573	136	0	0	0	.1	0	0
Pennsylvania	24.1	35.1	34.9	1012	62	0	0	0	0	0	0
South Dakota	19.9	11.7	2.0	0	1	0	0	0	0	0	0
Wisconsin	7.4	16.3	51.9	642	45	0	0	1.1	0	.2	.2

[1] Nitrogen
[2] Phosphate.
[3] Potassium.
Source: (62).

Appendix table 3--Summary of field operations for oats 1/

State	Times over an acre for specified operations						
	Moldboard, chisel, straight plow, one way	Disc, harrow, cultipack	Apply fertilizer, chemicals	Plant	Combine, bale, haul	Other 2/	Total
	Number						
Illinois	0.25	2.70	0.26	1.09	1.74	0.03	6.12
Indiana	.51	1.98	.58	.85	1.18	.03	5.13
Iowa	.18	2.69	.16	1.00	2.54	.02	6.59
Kansas	.60	2.28	.45	1.00	1.26	.0	5.59
Michigan	.63	2.62	1.19	.98	1.27	.15	6.84
Minnesota	.80	3.07	.70	1.00	2.91	.24	8.72
Nebraska	.29	2.42	.64	1.02	1.48	0	5.85
New York	.98	2.71	.63	.98	1.87	.16	7.33
North Dakota	1.55	1.43	.50	.56	1.97	.16	6.17
Ohio	.78	1.85	.84	.90	1.59	.17	6.13
Pennsylvania	.94	1.99	.63	1.00	1.76	.06	6.38
South Dakota	.61	1.98	.56	.81	2.00	.01	5.97
Wisconsin	.93	3.32	.47	1.03	2.10	.42	8.27

1/ Excludes custom operations.
2/ Rotary mower, rock picker.
Source: (62).

Appendix table 4--Proportion of oats production marketed by alternative methods, selected States, 1982

State	Share sold directly from field	Share delivered to off-farm destinations	Share hauled to farm storage
		Percent	
Illinois	2.46	22.51	75.03
Indiana	.93	29.92	69.15
Iowa	.87	17.79	81.34
Missouri	0	0	0
Ohio	2.09	36.82	61.09
Corn Belt	1.53	25.76	72.70
Kansas	.51	23.32	76.17
Nebraska	1.15	11.96	86.88
North Dakota	.76	20.74	78.50
South Dakota	0	15.06	89.94
Northern Plains	.50	17.60	81.90
Michigan	0	30.56	69.44
Minnesota	0	9.55	90.45
Wisconsin	2.71	2.21	95.07
Lake States	1.02	11.82	87.15
New York	2.27	17.83	79.90
Pennsylvania	3.54	10.83	85.63
Northeast	2.92	14.25	82.82

Source: (62).

Appendix table 5--Pricing methods used for oats sold from the field, selected States, 1982

State	Share sold by --		
	Forward contract	Cash market	Price-later contract
		Percent	
Illinois	0	100.00	0
Indiana	0	100.00	0
Iowa	0	94.68	5.32
Missouri	0	0	0
Ohio	0	100.00	0
Corn Belt	0	99.01	.99
Kansas	0	100.00	0
Nebraska	0	100.00	0
North Dakota	0	100.00	0
South Dakota	0	0	0
Northern Plains	0	100.00	0
Michigan	0	0	0
Minnesota	0	0	0
Wisconsin	0	100.00	0
Lake States	0	100.00	0
New York	0	100.00	0
Pennsylvania	0	100.00	0
Northeast	0	100.00	0

Source: (62).

Appendix table 6--Disposition of oats delivered to off-farm destinations at harvest, selected States, 1982

State	Returned to farm	Transferred to buyer	Placed in storage
		Percent	
Illinois	0	69.70	30.30
Indiana	0	74.29	25.71
Iowa	4.53	66.61	28.86
Missouri	0	0	0
Ohio	1.12	72.73	26.15
Corn Belt	1.40	71.09	27.51
Kansas	.27	51.41	48.32
Nebraska	0	94.52	5.48
North Dakota	0	94.67	5.33
South Dakota	0	89.80	10.20
Northern Plains	.08	80.29	19.63
Michigan	7.79	47.03	45.18
Minnesota	0	78.51	21.49
Wisconsin	0	76.52	23.48
Lake States	4.83	58.84	36.32
New York	0	14.63	85.37
Pennsylvania	0	42.30	57.70
Northeast	0	25.37	74.63

Source: (62).

Appendix table 7--Pricing methods used to establish a price for oats delivered to buyers at harvest, selected States, 1982

State	Pricing set by -- Forward contract	Cash market	Price-later contract
		Percent	
Illinois	0	100.00	0
Indiana	11.53	88.47	0
Iowa	13.88	86.12	0
Missouri	0	0	0
Ohio	.14	99.72	.14
Corn Belt	5.91	94.94	.05
Kansas	12.45	87.55	0
Nebraska	0	84.21	15.79
North Dakota	39.63	60.37	0
South Dakota	11.53	88.47	0
Northern Plains	18.73	78.91	2.37
Michigan	49.07	50.93	0
Minnesota	0	100.00	0
Wisconsin	0	100.00	0
Lake States	22.47	69.94	7.59
New York	0	83.33	16.67
Pennsylvania	0	100.00	0
Northeast	0	94.12	5.88

Source: (62).

Appendix table 8—Disposition of oats stored on the farm following harvest, selected States, 1982

State	Delivered to CCC	Fed to livestock	Remaining in storage	Sold
		Percent		
Illinois	0	52.99	27.81	19.21
Indiana	0	68.33	20.65	11.01
Iowa	0	57.08	36.65	4.28
Missouri	0	0	0	0
Ohio	0	50.66	34.72	14.63
Corn Belt	0	57.08	31.72	11.20
Kansas	0	66.43	25.17	8.40
Nebraska	0	46.83	34.00	19.17
North Dakota	0	53.03	34.59	12.38
South Dakota	0	45.81	37.07	17.12
Northern Plains	0	51.86	33.45	14.69
Michigan	0	57.15	32.23	10.63
Minnesota	0	50.52	36.18	13.30
Wisconsin	0	49.00	38.77	12.24
Lake States	0	51.16	36.49	12.35
New York	0	47.89	31.50	20.62
Pennsylvania	0	59.35	26.23	14.42
Northeast	0	53.94	28.72	17.35

Source: (62).

Appendix table 9--Pricing methods used to establish a price for oats sold from farm storage, selected states, 1982 crop

State	Share sold by --		
	Forward contract	Cash market	Price-later contract
		Percent	
Illinois	15.77	68.46	15.77
Indiana	0	100.00	0
Iowa	0	100.00	0
Missouri	0	0	0
Ohio	16.03	67.14	16.82
Corn Belt	10.56	78.69	10.75
Kansas	0	83.67	16.33
Nebraska	12.22	87.78	0
North Dakota	0	100.00	0
South Dakota	3.15	96.85	1.95
Northern Plains	4.56	93.49	0
Michigan	0	100.00	0
Minnesota	2.33	97.67	0
Wisconsin	0	100.00	0
Lake States	1.00	99.00	0
New York	26.39	60.41	13.20
Pennsylvania	0	100.00	0
Northeast	14.81	77.49	7.40

Source: (62).

Appendix table 10--U.S. oats production costs

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
						Dollars per planted acre					
Cash receipts:											
Primary crop	60.99	60.23	56.70	57.60	66.32	74.28	91.15	78.33	70.82	83.96	48.38
Secondary crop	29.84	31.11	38.42	32.57	21.38	27.24	30.22	25.44	23.78	20.78	22.59
Total	90.83	91.34	95.12	90.17	87.70	101.52	121.37	103.77	94.60	104.74	70.97
Cash expenses:											
Seed	3.28	3.18	2.79	4.60	4.90	5.63	7.13	7.15	5.71	8.82	8.46
Fertilizer	7.42	5.57	5.20	6.83	7.55	9.26	9.26	11.17	9.91	10.81	9.96
Lime and gypsum	.59	.61	.63	.78	.93	1.08	1.10	1.35	1.31	1.38	1.36
Chemicals	.31	.29	.26	.78	.80	.87	.95	1.25	1.34	1.32	1.11
Custom operations	1.97	1.96	2.84	2.82	3.05	3.49	3.75	4.21	4.04	4.10	3.95
Fuel, lubrication, and electricity	3.29	3.22	4.63	4.54	7.20	10.34	11.70	11.89	10.53	8.80	7.67
Repairs	4.76	4.30	5.76	5.57	6.01	6.79	7.71	7.59	7.86	7.95	7.24
Hired labor 1/	NA	NA	NA	NA	NA	NA	NA	NA	1.16	1.22	1.20
Miscellaneous	.69	.67	.67	.70	.77	1.24	1.22	.94	.96	.98	.97
Technical services	NA	NA	NA	NA	NA	NA	NA	NA	.06	.06	.06
Total, variable expenses	22.31	19.79	22.78	26.62	31.21	38.70	42.82	45.61	42.88	45.44	41.99
General farm overhead	2.86	3.30	3.42	4.65	6.04	5.73	6.57	4.67	5.18	5.32	5.28
Taxes and insurance	3.94	4.24	4.79	5.29	5.84	10.57	10.65	12.21	12.35	13.33	13.73
Interest	9.74	9.51	9.37	9.70	10.40	11.20	17.82	13.17	14.07	14.66	14.44
Total, fixed expenses	16.55	17.05	17.58	19.64	22.28	27.50	35.04	30.05	31.60	33.31	33.45
Total, cash expenses	38.86	36.83	40.36	46.26	53.49	66.20	77.86	75.66	74.48	78.75	75.43
Receipts less cash expenses	51.97	54.51	54.76	43.91	34.21	35.32	43.51	28.11	20.12	25.99	-4.46
Capital replacement	8.91	10.34	11.46	14.05	15.25	16.60	18.39	22.05	22.98	23.09	20.91
Receipts less cash expenses and replacement	43.06	44.17	43.30	29.86	18.96	18.72	25.12	6.06	-2.86	2.90	-25.37
Economic (opportunity) costs:											
Variable expenses	22.31	19.79	22.78	26.62	31.21	38.70	42.82	45.61	42.88	45.44	41.99
General farm overhead	2.86	3.30	3.42	4.65	6.04	5.73	6.57	4.67	5.18	5.32	5.28
Taxes and insurance	3.94	4.24	4.79	5.29	5.84	10.57	10.65	12.21	12.35	13.33	13.73
Capital replacement	8.91	10.34	11.46	14.05	15.25	16.60	18.39	22.05	22.98	23.09	20.91
Allocated returns to owned inputs:											
Return to operating capital	.40	.33	.34	.58	.86	1.21	1.60	1.40	1.03	1.25	.90
Return to other nonland capital	3.43	3.98	4.41	5.41	5.87	6.33	7.11	9.60	9.81	9.96	9.15
Net land rent	15.44	13.84	14.81	19.45	22.70	19.39	23.52	26.82	24.25	26.35	16.78
Labor (paid and unpaid) 1/	5.26	5.80	6.46	9.87	10.69	11.63	12.74	13.40	11.76	12.34	12.17
Total, economic (opportunity) costs	62.55	61.61	68.47	85.91	98.45	110.16	123.40	135.76	130.24	137.08	120.90
Residual returns to management and risk	28.28	29.73	26.65	4.25	-10.75	-8.64	-2.03	-31.99	-35.64	-32.34	-49.93
Net returns to owned inputs	52.80	53.67	52.67	39.56	29.36	29.92	42.94	19.23	11.21	17.56	-10.93
						Dollars per bushel					
Harvest period price	1.40	1.49	1.05	1.15	1.30	1.49	1.73	1.42	1.45	1.65	1.09
						Bushels per planted acre					
Yield	43.60	40.30	53.80	50.10	50.90	49.92	52.84	55.25	48.92	50.82	44.27

NA = Not available

1/ Hired labor (a cash expense) and unpaid labor could not be separately identified, given available survey data, prior to 1983. Since 1983, they have been listed separately.

Source: (39, 56, 57).

Appendix table 11--U.S. oats production costs, Northeast

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
						Dollars per planted acre					
Cash receipts:											
Primary crop	73.31	79.79	56.61	66.25	79.90	98.99	103.64	92.44	86.17	106.09	69.02
Secondary crop	40.60	46.65	43.41	42.40	38.92	43.45	62.94	37.78	37.91	41.34	41.17
Total	113.90	126.43	100.02	108.65	118.82	142.44	166.58	130.22	124.08	147.43	110.19
Cash expenses:											
Seed	3.86	3.58	3.88	6.37	6.16	6.90	9.25	8.70	7.29	12.47	12.61
Fertilizer	21.29	16.15	14.52	14.29	15.97	20.39	21.28	22.35	19.82	20.86	19.97
Lime and gypsum	0	.91	1.93	1.55	1.65	1.79	1.92	9.69	9.78	10.08	9.97
Chemicals	.43	.36	.42	2.82	2.88	3.06	3.32	3.06	3.13	3.02	2.95
Custom operations	4.16	4.55	4.97	5.69	6.26	6.91	7.35	5.51	5.56	5.51	5.60
Fuel, lubrication, and electricity	4.80	5.17	5.61	6.34	9.36	12.86	15.39	14.79	13.52	11.70	11.02
Repairs	5.84	5.80	5.86	6.53	6.89	7.68	8.65	9.79	10.08	10.00	9.85
Hired labor 1/	NA	NA	NA	NA	NA	NA	NA	NA	1.66	1.63	1.69
Miscellaneous	.98	.96	.96	1.00	1.06	1.75	1.80	1.32	1.34	1.36	1.36
Technical services	NA	NA	NA	NA	NA	NA	NA	NA	.16	.17	.17
Total, variable expenses	41.35	37.48	38.15	44.59	50.23	61.34	68.96	75.37	72.34	76.79	75.18
General farm overhead	3.68	4.22	4.49	7.85	11.35	15.09	9.82	5.56	9.57	9.75	9.71
Taxes and insurance	3.93	4.46	5.09	5.52	6.09	11.77	13.19	16.47	17.04	17.24	18.28
Interest	19.95	19.66	19.48	19.88	20.76	21.77	15.25	15.63	12.01	14.43	13.92
Total, fixed expenses	27.56	28.34	29.06	33.25	38.20	48.63	38.26	37.66	38.62	41.42	41.91
Total, cash expenses	68.92	65.81	67.21	77.84	88.43	109.97	107.22	113.03	109.30	118.21	117.09
Receipts less cash expenses	44.99	60.62	32.81	30.81	30.39	32.47	59.36	17.19	13.12	29.22	-6.90
Capital replacement	9.31	12.91	14.60	15.13	16.48	18.13	19.83	28.78	30.07	31.42	30.92
Receipts less cash expenses and replacement	35.68	47.71	18.21	15.68	13.91	14.34	39.53	-11.59	-16.95	-2.20	-37.82
Economic (opportunity) costs:											
Variable expenses	41.35	37.48	38.15	44.59	50.23	61.34	68.96	75.37	72.34	76.79	75.18
General farm overhead	3.68	4.22	4.49	7.85	11.35	15.09	9.82	5.56	9.57	9.75	9.71
Taxes and insurance	3.93	4.46	5.09	5.52	6.09	11.77	13.19	16.47	17.04	17.24	18.28
Capital replacement	9.31	12.91	14.60	15.13	16.48	18.13	19.83	28.78	30.07	31.42	30.92
Allocated returns to owned inputs:											
Return to operating capital	.85	.67	.71	1.03	1.51	2.10	2.83	2.50	1.89	2.26	1.72
Return to other nonland capital	3.65	5.06	5.72	5.93	6.46	7.05	7.83	13.46	13.90	14.01	13.90
Net land rent	5.69	6.44	8.56	13.87	14.54	10.48	10.82	11.55	11.04	12.03	8.66
Labor (paid and unpaid) 1/	8.71	9.80	10.92	14.61	15.11	16.45	17.84	18.34	16.81	16.49	17.04
Total, economic (opportunity) costs	77.17	81.04	88.24	108.52	121.77	142.41	151.12	172.03	172.66	179.98	175.40
Residual returns to management and risk	36.74	45.50	11.78	.13	-2.95	.03	15.46	-41.81	-48.58	-32.55	-65.21
Net returns to owned inputs	55.63	67.37	37.69	35.56	34.67	36.11	54.78	4.04	-4.94	12.23	-23.90
						Dollars per bushel					
Harvest period price	1.52	1.63	1.15	1.25	1.42	1.72	1.76	1.53	1.60	1.96	1.05
						Bushels per planted acre					
Yield	48.20	49.10	49.40	53.00	56.40	57.68	59.01	60.51	53.74	54.24	65.61

NA = Not available.

1/ Hired labor (a cash expense) and unpaid labor could not be separately identified, given available survey data, prior to 1983. Since 1983, they have been listed separately.

Source: (39, 56, 57).

Appendix table 12--U.S. oats production costs, Northern Plains

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
						Dollars per planted acre					
Cash receipts:											
Primary crop	50.78	40.73	45.56	52.47	57.59	51.81	72.15	74.08	59.06	70.24	42.75
Secondary crop	15.48	13.11	19.24	18.49	13.31	16.89	19.66	6.74	6.27	7.24	7.58
Total	66.26	53.83	64.80	70.96	70.90	68.70	91.81	80.82	65.33	77.48	50.33
Cash expenses:											
Seed	3.41	3.42	2.82	3.74	3.89	4.52	6.17	6.18	4.80	6.65	6.27
Fertilizer	6.38	4.44	4.31	4.41	4.92	4.82	4.75	7.74	7.08	7.88	7.53
Chemicals	.39	.25	.22	.60	.61	.61	.69	.98	1.05	.97	.92
Custom operations	1.64	1.32	2.28	2.57	2.82	2.99	3.33	2.64	2.32	2.69	2.02
Fuel, lubrication, and electricity	1.93	1.53	2.62	2.91	4.98	6.83	8.28	9.45	8.22	6.89	5.66
Repairs	3.73	2.73	4.35	4.77	5.02	5.34	6.60	7.24	7.29	7.49	6.52
Hired labor 1/	NA	NA	NA	NA	NA	NA	NA	NA	.84	.90	.83
Miscellaneous	.38	.37	.38	.39	.41	.63	.66	.50	.51	.52	.52
Technical services	NA	NA	NA	NA	NA	NA	NA	.02	.02	.02	.02
Total, variable expenses	17.86	14.07	16.97	19.39	22.65	25.74	30.48	34.75	32.13	34.01	30.28
General farm overhead	1.60	1.83	1.95	3.43	4.03	3.53	4.74	3.94	4.26	4.38	4.41
Taxes and insurance	4.00	4.07	4.66	5.06	5.51	6.31	6.96	7.55	7.39	7.90	7.72
Interest	5.79	5.61	5.50	5.76	6.30	6.91	12.61	11.85	12.28	11.81	11.56
Total, fixed expenses	11.39	11.51	12.11	14.25	15.84	16.75	24.31	23.34	23.93	24.09	23.69
Total, cash expenses	29.25	25.57	29.08	33.64	38.49	42.49	54.79	58.09	56.06	58.10	53.97
Receipts less cash expenses	37.01	28.26	35.72	37.32	32.41	26.21	37.02	22.73	9.27	19.38	-3.64
Capital replacement	9.15	8.76	10.19	12.46	13.03	13.42	16.28	18.24	18.59	19.50	16.30
Receipts less cash expenses and replacement	27.86	19.50	25.53	24.86	19.38	12.79	20.74	4.49	-9.32	-.12	-19.94
Economic (opportunity) costs:											
Variable expenses	17.86	14.07	16.97	19.39	22.65	25.74	30.48	34.75	32.13	34.01	30.28
General farm overhead	1.60	1.83	1.95	3.43	4.03	3.53	4.74	3.94	4.26	4.38	4.41
Taxes and insurance	4.00	4.07	4.66	5.06	5.51	6.31	6.96	7.55	7.39	7.90	7.72
Capital replacement	9.15	8.76	10.19	12.46	13.03	13.42	16.28	18.24	18.59	19.50	16.30
Allocated returns to owned inputs:											
Return to operating capital	.34	.24	.26	.40	.58	.77	1.08	.92	.68	.80	.61
Return to other nonland capital	3.50	3.35	3.89	4.76	4.98	5.05	6.24	7.82	7.73	8.00	6.71
Net land rent	13.15	10.39	12.15	13.42	15.86	14.95	19.88	21.13	18.13	20.01	12.12
Labor (paid and unpaid) 1/	4.37	4.63	5.46	6.84	7.02	7.35	8.79	9.28	8.45	9.10	8.36
Total, economic (opportunity) costs	53.96	47.34	55.53	65.75	73.65	77.12	94.45	103.63	97.36	103.70	86.52
Residual returns to management and risk	12.30	6.50	9.27	5.21	-2.76	-8.42	-2.64	-22.81	-32.03	-26.22	-36.19
Net returns to owned inputs	33.65	25.11	31.03	30.62	25.68	19.70	33.35	16.34	2.96	11.69	-8.38
						Dollars per bushel					
Harvest period price	1.35	1.44	1.02	1.11	1.26	1.47	1.72	1.36	1.33	1.55	1.09
						Bushels per planted acre					
Yield	37.70	28.30	44.90	47.40	45.90	35.16	41.95	54.57	44.29	45.39	39.11

NA = Not available.

1/ Hired labor (a cash expense) and unpaid labor could not be separately identified given available survey data, prior to 1983. Since 1983 they have been listed separately.

Source: (39, 56, 57).

Appendix table 13—U.S. oats production costs, Lake States and Corn Belt

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
	Dollars per planted acre										
Cash receipts:											
Primary crop	66.98	71.71	65.72	60.29	70.83	84.63	103.47	79.99	80.06	93.19	50.40
Secondary crop	39.84	45.03	54.14	41.44	24.70	31.32	33.23	39.08	38.70	30.02	31.65
Total	106.82	116.74	119.85	101.73	95.53	115.95	136.70	119.70	118.76	123.21	82.05
Cash expenses:											
Seed	3.10	2.98	2.65	5.04	5.45	6.14	7.54	7.75	6.37	10.26	9.65
Fertilizer	6.62	5.20	4.92	7.73	8.32	10.42	10.83	12.54	11.33	12.16	10.75
Lime and gypsum	1.07	.97	1.01	1.26	1.50	1.64	1.80	1.40	1.47	1.54	1.49
Chemicals	.23	.31	.28	.66	.66	.73	.80	1.25	1.39	1.41	1.07
Custom operations	1.96	2.11	2.97	2.67	2.79	3.32	3.55	5.32	5.48	5.15	5.18
Fuel, lubrication, and electricity	4.20	4.45	6.23	5.52	8.49	12.15	13.70	13.52	12.34	10.11	8.81
Repairs	5.43	5.31	6.93	6.05	6.61	7.56	8.39	7.59	8.12	8.10	7.51
Hired labor 1/	NA	NA	NA	NA	NA	NA	NA	NA	1.41	1.45	1.43
Miscellaneous	.89	.87	.88	.91	.99	1.55	1.54	1.32	1.34	1.36	1.36
Technical services	NA	NA	NA	NA	NA	NA	NA	NA	.08	.08	.08
Total, variable expenses	23.49	22.19	25.87	29.84	34.81	43.51	48.15	50.76	49.33	51.62	47.33
General farm overhead	3.79	4.34	4.62	5.09	6.77	5.76	7.46	5.15	5.48	5.61	5.45
Taxes and insurance	3.92	4.33	4.88	5.44	6.05	13.03	13.02	15.47	16.48	17.56	17.65
Interest	10.74	10.48	10.33	10.70	11.47	12.36	22.08	13.93	16.05	17.14	16.57
Total, fixed expenses	18.46	19.15	19.83	21.22	24.29	31.15	42.56	34.55	38.01	40.31	39.68
Total, cash expenses	41.95	41.34	45.70	51.06	59.10	74.66	90.71	85.31	87.34	91.93	87.00
Receipts less cash expenses	64.87	75.41	74.16	50.66	36.44	41.29	45.99	33.76	31.42	31.28	-4.95
Capital replacement	8.69	11.12	12.17	15.09	16.65	18.35	19.76	24.30	26.26	25.21	23.26
Receipts less cash expenses and replacement	56.18	64.29	61.99	35.57	19.79	22.94	26.23	9.46	5.16	6.07	-28.21
Economic (opportunity) costs:											
Variable expenses	23.49	22.19	25.87	29.84	34.81	43.51	48.51	50.76	49.33	51.62	47.33
General farm overhead	3.79	4.34	4.62	5.09	6.77	5.76	7.46	5.15	5.48	5.61	5.45
Taxes and insurance	3.92	4.33	4.88	5.44	6.05	13.03	13.02	15.47	16.48	17.56	17.65
Capital replacement	8.69	11.12	12.17	15.09	16.65	18.35	19.76	24.30	26.26	25.21	23.26
Allocated returns to owned inputs:											
Return to operating capital	.40	.34	.38	.67	.98	1.35	1.80	1.65	1.26	1.51	1.03
Return to other nonland capital	3.35	4.28	4.69	5.81	6.41	7.01	7.66	10.55	11.25	11.17	10.44
Net land rent	20.07	17.95	19.88	25.77	29.78	29.39	28.12	33.38	31.83	33.51	20.97
Labor (paid and unpaid) 1/	5.50	6.15	6.80	11.53	12.72	13.59	14.93	16.12	14.26	14.63	14.45
Total, economic (opportunity) costs	69.21	70.70	79.29	99.23	114.17	131.99	140.90	157.38	156.15	160.82	140.58
Residual returns to management and risk	37.61	46.05	40.57	2.49	-18.64	-16.04	-4.20	-38.31	-37.39	-37.61	-58.53
Net returns to owned inputs	66.92	74.77	72.31	46.27	31.26	35.30	48.31	23.39	21.21	23.21	-11.64
	Dollars per bushel										
Harvest period price	1.42	1.51	1.07	1.16	1.32	1.46	1.72	1.45	1.52	1.69	1.10
	Bushels per planted acre										
Yield	47.30	47.40	61.60	51.80	53.70	57.92	60.05	55.14	52.73	55.10	45.89

NA = Not available.

1/ Hired labor (a cash expense) and unpaid labor could not be separately identified, given available survey data, prior to 1983. Since 1983, they have been listed separately.

Source: (39, 56, 57).

Economic Research Service Data Bases Available

The U.S. Department of Agriculture's Economic Research Service has developed a series of computerized data bases covering important elements of today's agribusiness and related activities here and abroad.

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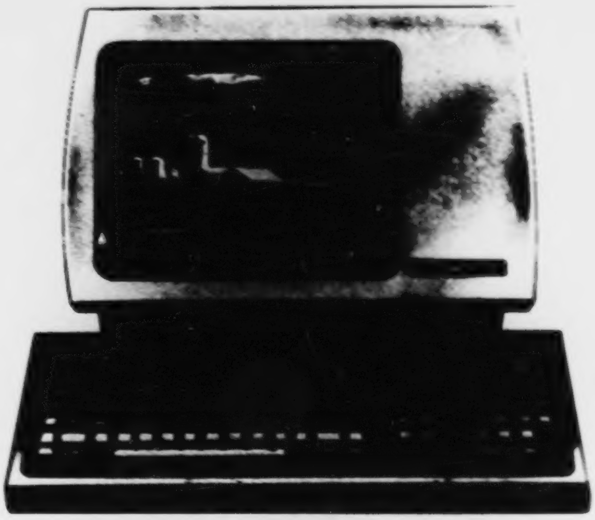

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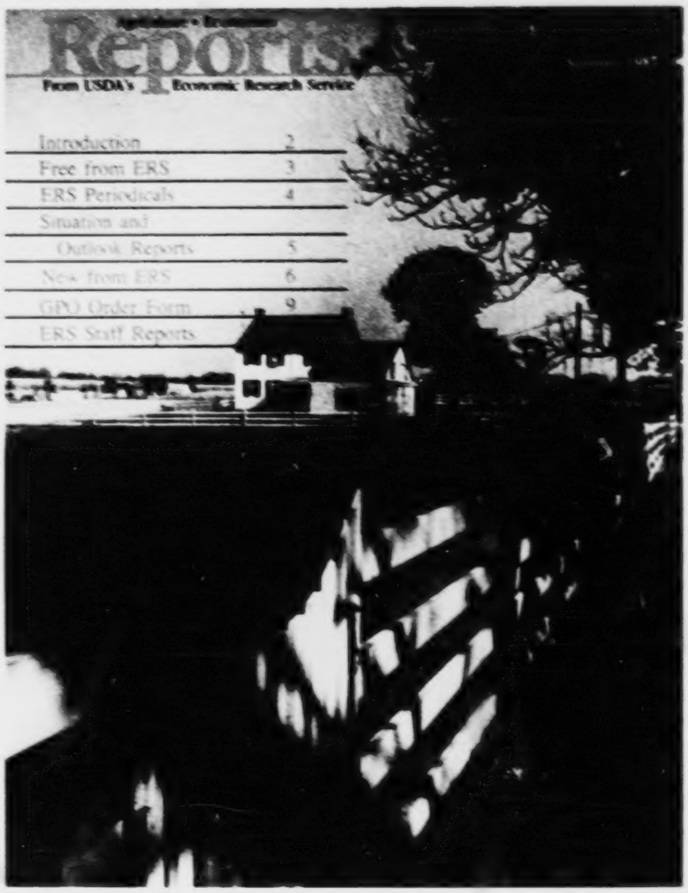

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